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The U.K.'s antitrust watchdog rejected Microsoft's \$75 billion deal to buy Activision, raising questions about whether the combination will get done. A1

◆ **Disney accused Florida's DeSantis in a lawsuit of waging a "targeted campaign of government retaliation" against the company for criticizing legislation he backed. A1**

◆ **Boeing said a new production problem expected to delay deliveries of its 737 jets this summer won't disrupt the company's overall financial outlook for the year. B1**

◆ **U.S. stock indexes ended mixed, with the S&P 500 and Dow declining 0.4% and 0.7%, respectively, and the Nasdaq gaining 0.5%. B11**

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World-Wide

◆ **House Republicans passed a bill proposing to raise the nation's borrowing limit in exchange for deep cuts in government spending, aiming to jump-start talks with Biden ahead of an approaching deadline to avoid default. A1**

◆ **Chinese leader Xi called Ukraine's Zelensky, their first conversation since the Russian invasion over a year ago, as Beijing attempts to portray itself as a potential peace-maker in the conflict. A8**

◆ **The U.S. has agreed to give Seoul a greater voice in consultations on a potential American nuclear response to a North Korean attack in return for swearing off developing its own nuclear weapons. A9**

◆ **The airman charged with taking and sharing highly classified intelligence documents might still have access to sensitive material, prosecutors said in court filings. A6**

◆ **Writer E. Jean Carroll testified that she was raped by Trump in the 1990s, telling the jury in a civil trial the alleged assault had scarred her over the decades since. A3**

◆ **A federal appeals court paved the way for Pence to appear before the grand jury investigating Trump's efforts to remain in power after the 2020 election. A3**

◆ **The Justice Department filed a lawsuit challenging Tennessee's recent ban on certain healthcare for transgender minors. A3**

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The U.K.'s antitrust regulator blocked Microsoft's \$75 billion bid for Activision Blizzard, maker of hit videogame 'Call of Duty.'

U.K. Blocks Microsoft's Deal For Activision, Imperiling Bid

By KIM MACKRAEL AND SARAH E. NEEDLEMAN

The U.K.'s antitrust watchdog rejected Microsoft Corp.'s \$75 billion deal to buy game maker Activision Blizzard Inc., raising big questions about whether the combination will ever get done and scrambling both companies' short-term strategies.

The Competition and Markets Authority's ruling, issued Wednesday, said Microsoft had failed to convince the agency that actions the companies had proposed since announcing the deal would sufficiently ease the regulator's competi-

tion worries. The CMA has said the deal poses a competition threat to the U.K.'s gaming industry and has been reviewing it for months.

The decision casts a long shadow over the prospects of a deal happening at all. Microsoft and Activision said they would contest the ruling, but antitrust lawyers and academics said such a push is an uphill battle.

The CMA's investigation focused solely on the U.K. market. But because the videogame industry is complex and global, it would be very difficult for a combined Microsoft-Activision to operate com-

pletely outside that market.

The U.S. Federal Trade Commission and the European Union's competition watchdog also are scrutinizing the deal. The U.K.'s decision wouldn't have any direct bearing on those other proceedings, but such global deals typically need the endorsement of the world's biggest competition authorities to move ahead.

The CMA's decision punctuates a shift in the approach of global antitrust enforcers toward competition issues among the world's biggest tech companies. The European Union for years has scrutinized big,

mostly U.S., tech companies over a wide swath of issues, including privacy, taxes and alleged anticompetitive behavior.

The Trump and Biden administrations in recent years have started to do the same, while competition authorities on both sides of the Atlantic have taken a harder look at deal making in the industry.

"For a very long time, competition authorities were criticized for being weak on mergers, especially in the digital

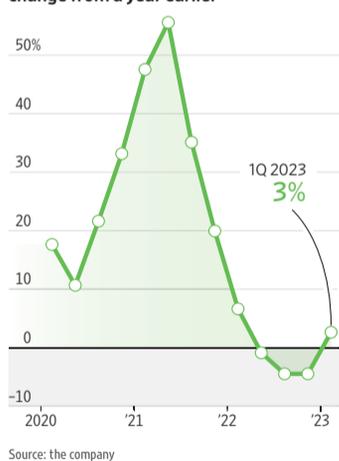
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◆ **Heard on the Street: Deal or no deal, Microsoft has game..... B12**

Meta Sales End Streak of Declines

Facebook parent Meta Platforms posted its first increase in revenue after three quarters of declines, climbing 3% to \$28.6 billion. The company cited continued improvements in its advertising business, as well as its ongoing efforts to pare back spending. B1

Meta Platforms' quarterly revenue, change from a year earlier



Source: the company

Disney Sues Florida's DeSantis, Accusing Him of Retaliation

By ARIAN CAMPO-FLORES AND JACOB GERSHMAN

Walt Disney Co. accused Florida Gov. Ron DeSantis in a lawsuit of waging a "targeted campaign of government retaliation" against the company for criticizing legislation he backed, escalating the yearlong battle between the entertainment giant and the potential 2024 presidential candidate.

The lawsuit, filed Wednesday in federal court in Tallahassee, Fla., came minutes after a new board Mr. DeSantis named to oversee the district covering the company's theme parks de-

clared null and void agreements Disney struck in February.

The suit alleges violations of several provisions of the U.S. Constitution and names the five DeSantis-appointed board members and other officials. It says the board's action Wednesday was the latest strike against the company.

"This government action was patently retaliatory, patently antibusiness, and patently unconstitutional," the complaint reads. "But the Governor and his allies have made clear they do not care and will not stop."

Taryn Fenske, a spokeswoman for the Republican gov-

ernor, said: "We are unaware of any legal right that a company has to operate its own government or maintain special privileges not held by other businesses in the state." She added, referring to Disney, "This lawsuit is yet another unfortunate example of their hope to undermine the will of the Florida voters and operate outside the bounds of the law."

The lawsuit brings the saga involving Mr. DeSantis and Disney to the courts after a year of moves and counters between a popular governor and one of Florida's largest employers. It

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SPACs Are Running Out of Money

By AMRITH RAMKUMAR AND SHANE SHIFFLETT

The SPAC boom took hundreds of risky companies to the stock market. The next stop for many is bankruptcy court.

Dozens of companies that merged with SPACs are running out of cash, joining at least 12 that have already gone bankrupt after combin-

ing with special-purpose acquisition companies.

More than 100 companies, including electric-scooter firm Bird Global Inc., smart-sock baby-monitor maker Owlet Inc. and electric-car startup Faraday Future Intelligent Electric Inc. are running out of cash, according to a Wall Street Journal analysis of the companies' cash and cash flow

from operations data disclosed in regulatory filings.

Shares of many of these companies trade under \$1, more than 90% below where they did when they went public, and are in danger of being delisted. Those that have raised cash typically have done it on onerous terms. Bird extended its runway by merg-

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U.S. Military Has Explosives Problem

Sole domestic maker of crucial type of gunpowder blew up two years ago

By GORDON LUBOLD

MINDEN, La.—Nearly two years ago, an errant spark inside a mill caused an explosion so big it destroyed all the building's equipment and blew a corrugated fiberglass wall 100 feet.

It also shut down the sole domestic source of an explosive the Department of Defense relies on to produce bullets, mortar shells, artillery rounds and Tomahawk missiles.

The ramshackle facility makes the original form of gunpowder, known today as black powder, a highly combustible material with hundreds of military applications. The product, for which there is no substitute, is used in small quantities in munitions to ignite more powerful explosives.

No one was hurt in the

June 2021 blast. But the factory remains offline, unable to deliver its single vital component to either commercial or Pentagon customers.

Military suppliers consolidated at the Cold War's end, under pressure to reduce defense costs and streamline the nation's industrial base. Over the past three decades, the number of fixed wing aircraft suppliers in the U.S. has declined from eight to three. During the same period, major surface ship producers fell from eight to two, and today, only three American companies supply over 90% of the Pentagon's missile stockpile.

Lower-tier defense firms are often the sole maker of vital parts—such as black powder—and a single crisis can bring production to a

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Tiny Tesla Wannabe Fits Three, 'But They Can't Be Very Fat'

Bolivia's home-grown EV has a top speed of 35 mph, a range of just 60 miles

By RYAN DUBE

COCHABAMBA, Bolivia—High in the Andes, the electric-vehicle revolution has arrived. It's moving no faster than 35 mph and can be a bit claustrophobic.

While Tesla and other car makers pride themselves on turning out luxurious, aerodynamic EVs—some with a speed

topping 200 mph—Bolivia's Quantum Motors is offering a much mellower ride.

The size of a golf cart and built like a box, Quantum's cars technically have room for three people with space up front for just the driver and two passengers snuggled into the back. Forget a trunk. Or long-distance road trips. It can

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INSIDE



SPORTS

At NFL draft, quarterback Anthony Richardson is a puzzle and a hot prospect. A16

U.S. NEWS

CAPITAL ACCOUNT | By Greg Ip

Banking Turmoil Is Tip of Debt Iceberg



The biggest question facing the economy lately has been: How bad will the banking turmoil be?

The next question should be: Will it spread beyond the banks? That is because the collapse of Silicon Valley Bank a month ago, which touched off this bout of turmoil, was a symptom, not a cause, of broader forces.

SVB's core problem was that it owned a lot of government debt funded by unstable deposits. As interest rates rose sharply last year, the mark-to-market value of that debt plummeted, and deposits became more expensive and scarcer.

A lot of banks own similarly devalued bonds. But that is just the tip of a debt iceberg. Since the end of 2009, total debt owed by governments, business and households has risen 90% to \$68 trillion, according to the Federal Reserve.

Since early last year, interest rates have risen at their fastest pace since the early 1980s. When interest rates go up, the value of an existing loan or a bond goes down. This isn't always apparent in lenders earnings statements.

But regardless of accounting treatment, the economic reality is that those bonds and loans are worth a lot less

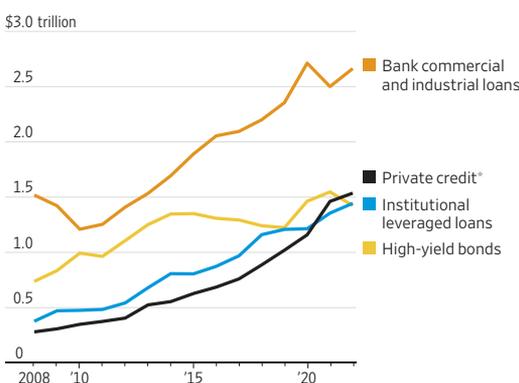
than when they were issued, and someone has to bear those losses. "That's going to show up somewhere in the system," said Hyun Song Shin, head of research for the Bank for International Settlements, a Switzerland-based consortium of central banks.

Banks are the most visible debtholders, but, collectively, just as much debt is held by pension and mutual funds, private-credit funds, life insurers, business-development companies, hedge funds, and other nonbanks—or, as they are sometimes called, shadow banks. Mr. Shin said, "Whether it's banks or nonbanks, they face the same risks.

For a long-only investor who doesn't borrow, such as a pension or mutual fund, the losses have few systemic consequences beyond feeling poorer. But for financial intermediaries it is more complicated: What they earn on their asset has now shrunk a lot relative to what they pay for funding. That hampers their ability to lend more and, for some, their ultimate survival.

The 2007-09 financial crisis began with shadow banks—and regulators have long assumed the next financial crisis would, too—in part because banks are more tightly regulated now. So it was a surprise when banks emerged as the

Banks vs. shadow banks



*Includes business development companies and middle-market collateralized loan obligations
Source: Federal Reserve (bank loans); IMF (leveraged loans, high-yield bonds, private credit)

weak link last month.

That could mean that shadow banking has become less risky since the last crisis—or it could simply mean its problems have yet to come to light.

In fact, shadow banking has had problems overseas, the International Monetary Fund points out in a report issued this month. Last September, concerns about the British budget caused government bond yields there to jump, inflicting losses on pension funds using leveraged "liability-driven investment" strategies. This forced the funds to sell bonds to meet margin calls, driving yields even higher.

In October, South Korean financing companies defaulted on commercial paper issued to finance real-estate project loans, triggering across-the-board increases in commercial paper and corporate-bond rates.

Nothing similar has happened in the U.S. yet. Still, shadow banks have grown considerably since the global financial crisis. The fastest-growing segment is private credit—loans to companies generally too small to issue bonds but which want to avoid more restrictive bank loans. Since the start of 2008, private credit has grown almost sixfold, to \$1.5 trillion, according to the IMF—bigger

than the high-yield bond or leveraged-loan markets.

Private credit is issued by funds managed by firms such as Ares Management Corp., HPS Investment Partners LLC, Blackstone Inc., BlackRock Inc., Apollo Global Management Inc., Carlyle Group Inc. and Goldman Sachs Asset Management, many of which are also prominent private-equity managers. (The IMF's \$1.5 trillion figure also includes business-development companies and middle-market collateralized loan obligations.)

Private credit is mostly financed with investor capital that is locked up for a few years, "so there is no run risk" as with deposits, commercial paper and repo loans, the IMF said. And while some private credit is subject to interest-rate risk, the loans are often floating-rate and thus adjust upward with interest rates.

But the IMF does cite several risks. Private credit often funds leveraged buyouts of companies more vulnerable to economic slowdowns, competition has led to laxer loan terms, and "managers of private-credit deals often finance deals of other managers, which concentrates risk," it said. The investors who commit capital to private-credit funds also do so for private equity and other alternative assets, the sort of interconnectedness that has

amplified stress in the past.

So even if private credit doesn't have the sort of runs that befell banks last month, it could face the same pressure to renege that banks do, aggravating the credit crunch and worsening the economic downturn. Fundraising by private-credit funds fell 42% last year from 2021, according to PitchBook Data.

Scoping the risk around shadow banking is hampered by, as the name suggests, its opacity. Private credit is less transparent than stocks and bonds, which are registered with the Securities and Exchange Commission, and loans by banks, which are federally regulated.

The SEC is worried enough about data gaps that last year it proposed updating and expanding the type of information it asks private funds to report on a filing called "Form PF." Last week, Treasury Secretary Janet Yellen proposed giving federal regulators more authority over big, complex nonbanks.

But there is little regulators can do about the underlying problem: Interest rates are likely to stay high because of stubborn inflation and an economy weakened by those high rates, which boosts loan defaults. As a result, strains will continue percolating through the financial system, though maybe not with the drama of a bank failure.



Indiana's Tippecanoe County, which includes Lafayette, saw a 13.2% year-to-year home-price increase.

Small Midwest Cities Lead Emerging Housing Index

By NICOLE FRIEDMAN

Emerging Housing Markets Index

Metro areas are ranked according to real-estate market data and economic health. Ranking is as of April 2023.

Rank	Change	Area	State
1		Lafayette-West Lafayette	Ind.
2	▲	Bloomington	Ill.
3		Elkhart-Goshen	Ind.
4	▲	Lebanon	Pa.
5	▼	Fort Wayne	Ind.
6	▼	Topeka	Kan.
7	▲	Sioux City	Iowa, Neb., S.D.
8	▲	Omaha-Council Bluffs	Neb., Iowa
9	▲	Springfield	Ill.
10	▲	Manchester-Nashua	N.H.

Source: The WSJ/Realtor.com Emerging Housing Markets Index Spring 2023

Small cities in the Midwest topped The Wall Street Journal/Realtor.com Emerging Housing Markets Index in the first quarter, a sign that buyer demand for affordable homes remains robust even as activity in the broader market slows.

Lafayette, Ind., led the index for the second consecutive quarter, followed by Bloomington, Ill.; Elkhart, Ind.; Lebanon, Pa., and Fort Wayne, Ind.

The index identifies the top metro areas for home buyers seeking an appreciating housing market, a strong local economy and appealing lifestyle amenities. News Corp, parent of the Journal, operates Realtor.com.

A rapid increase in mortgage rates in 2022 pushed many home buyers out of the market. Home sales in March dropped 22% from a year earlier, according to the National Association of Realtors.

While home prices have dropped in some parts of the country, they continue to rise in many markets in the eastern half of the U.S. On a national basis, the median home-sale price in March slid 0.9% from a year earlier, according to the NAR.

Eighteen of the top 20 markets in this quarter's index had median home-listing prices in March below the national median of \$424,000, said Danielle Hale, chief economist at Realtor.com. The top 20 markets on average had stronger price growth, faster home sales and lower unemployment than the market as a whole, she said.

The top 20 markets have an average population below 400,000.

The Lafayette metro area, which has about 225,000 resi-

dents, is home to Purdue University and a variety of manufacturing companies. The area has a strong job market and has underbuilt homes in recent years relative to population growth, which is helping push home prices higher, said Michael Hicks, an economics professor at Ball State University in Muncie, Ind.

The median home-sale price in Indiana's Tippecanoe County, which includes Lafayette, was \$283,000 in March, up 13.2% from a year earlier, according to the Indiana Association of Realtors. The national median existing-home sales price in March was \$375,700.

"While it has become more expensive, it is still more affordable than a lot of other areas of the country," said Brett Lueken, managing broker at Century 21 The Lueken Group in Lafayette.

Higher interest rates have reduced buyer demand, but they have also weighed on supply by discouraging home-

owners with low mortgage rates from selling their homes. Nationally, the number of new listings in March fell 20% from a year earlier, according to Realtor.com.

"There's just not a lot of houses on the market as of today," said Sally Curwick, broker associate at Re/Max at the Crossing in Lafayette. "I call it the one-to-two-day market."

The Wall Street Journal/Realtor.com Emerging Housing Markets Index ranks the 300 biggest metro areas in the U.S. In addition to housing-market indicators, the index incorporates economic and lifestyle data, including real-estate taxes, unemployment, wages, commute time and small-business loans.

Thirteen of this quarter's top 20 markets were also ranked in the top 20 in the fourth quarter. Some Midwest markets that entered the top 20 in the first quarter were Bloomington, Omaha, Neb., and Janesville, Wis.

Disney Sues Florida Governor

Continued from Page One

When Disney—under pressure from some employees and human-rights activists—said state legislation barring classroom instruction on gender identity and sexual orientation in early elementary-school years was harmful to LGBT youth, Mr. DeSantis fired back by calling Disney a "woke corporation" out of step with the values of Florida parents.

The Parental Rights in Education bill, now signed into law, is known by opponents as the "Don't Say Gay" law.

Disney is asking the court to declare the board's actions unlawful and unenforceable for various reasons, including violating the U.S. Constitution's Contracts Clause, unlawfully taking Disney's property rights in violation of the Takings Clause and arbitrarily voiding Disney's agreements in violation of the due process clause. It also argues that the board flouted the company's First Amendment rights by retaliating against it.

Disney is seeking a court declaration that those contracts remain in effect. It also is asking the court to find that two laws enacted in the past year with Mr. DeSantis's support—aimed at ending the company's control of the district housing its theme parks, previously known as the Reedy Creek Improvement District—are illegal and unenforceable.

Juan-Carlos Planas, a former Republican lawmaker who has taught law-school courses about Reedy Creek's legal structure, said the lawsuit makes persuasive arguments, especially those involving the First Amendment claims. "I think Disney has an extremely strong case," he said. "They have an extremely impressive legal team," including Daniel Petrocelli, who has represented a host of high-profile clients.

State Rep. Randy Fine, a Republican who last year filed one of the bills targeting Disney's district, said the company sued on the belief that it is entitled to special privileges that it has now lost.

"To equate being treated the same way as your competitors to punishment shows a stunning level of arrogance that will not stand in Florida," he said.

The apparent trigger for the lawsuit was the action Wednesday morning by the Central Florida Tourism Oversight District board of supervisors, which oversees the special tax district that includes Walt Disney World Resort and that the company effectively controlled for decades. In February, Mr. DeSantis signed into law legislation renaming the district and ending Disney's control of it.

They criticized agreements

Mr. DeSantis assailed the move as a subversion of the will of voters and the Legislature and vowed to undo it. In recent weeks, he has backed a legislative measure that would nullify the development agreement and restrictive covenants Disney secured in February and a bill amendment that would regulate its monorail.

At Wednesday's meeting, the board approved findings developed with the advice of its lawyers that the agreements are void and unenforceable, and it directed the district's staff to act accordingly.

"Disney picked the fight with this board," board Chairman Martin Garcia said.

Disney Chief Executive Robert Iger has called Florida's actions against the company over the past year antibusiness.

Disney's lead claim is that Mr. DeSantis and Florida lawmakers violated a constitutional provision protecting against government interference with private contracts.

The DeSantis administration could try to argue that the Contract Clause isn't implicated, said Cleveland State University law professor David Forte. He said Florida could claim the state wasn't clawing back a promise it made to Disney for financial benefit but merely restricting Disney's freedom to develop the land.

Disney's First Amendment retaliation claim alleges that Florida leaders punished Disney because the company was advancing political views they found objectionable.

Legal scholars expect Florida to argue that it had legitimate, good-faith reasons to change the governance of the special-tax district. Mr. DeSantis said the legislation he signed ended special privileges afforded to Disney and would ensure the company "pays its debts and fair share of taxes."

Stuart Benjamin, a First Amendment scholar at Duke University School of Law, said Florida's defense could be undermined by comments made by the governor and lawmakers blasting Disney for its political activism around the time of the land-use legislation's approval.

The company said Mr. DeSantis was targeting it for criticizing a law.

cemented by Disney in February, before the new board, aligned with Mr. DeSantis, took over. Disney went before the board's prior leadership, which it essentially handpicked under a previous structure that the state Legislature and Mr. DeSantis overhauled, and secured approvals for the next 30 years on zoning, infrastructure and air rights that the company might need if it chooses to expand Disney World.



Disney CEO Robert Iger

CORRECTIONS & AMPLIFICATIONS

Russian Foreign Minister Sergei Lavrov said: "Nobody allowed the Western minority to speak on behalf of all humankind." In some editions Wednesday, a World News article about Mr. Lavrov's comments on Tuesday at the United Nations incorrectly quoted him as saying "the Western majority."

Readers can alert The Wall Street Journal to any errors in news articles by emailing wsjcontact@wsj.com or by calling 888-410-2667.

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U.S. NEWS

Pence Is Cleared To Testify In Jan. 6 Probe

By C. RYAN BARBER

WASHINGTON—A federal appeals court paved the way late Wednesday for former Vice President Mike Pence to appear before the grand jury investigating former President Donald Trump's efforts to remain in power after the 2020 election.

In a sealed decision, a three-judge panel of the U.S. Court of Appeals for the District of Columbia Circuit rejected Mr. Trump's emergency bid to prevent Mr. Pence from testifying in the criminal inquiry, dealing the latest setback to the former president as he confronts a swirl of legal scrutiny.

The decision sets the stage for Mr. Pence to testify about conversations he had with Mr. Trump leading up to Jan. 6, 2021, and about a broader pressure campaign to stop the then-vice president from certifying the 2020 election results in his role as president of the Senate.

Mr. Trump has denied any wrongdoing in connection with the Jan. 6 attack on the Capitol or his efforts to be certified as the winner of the November 2020 presidential election.

Mr. Trump's legal team could appeal the decision to the full D.C. Circuit or to the Su-

Mr. Trump sought to block his former vice president from answering questions.

preme Court. The D.C. Circuit panel included Judges Patricia Millett and Robert Wilkins, both Obama appointees, and Judge Gregory Katsas, a Trump appointee.

Mr. Pence was subpoenaed this year by special counsel Jack Smith, who is overseeing the investigation into Mr. Trump's efforts to remain in power and a parallel inquiry into the handling of classified documents discovered at the former president's Mar-a-Lago estate in South Florida.

The subpoena marked an escalation of Mr. Smith's inquiry, prompting Mr. Trump to assert executive privilege in an attempt to block Mr. Pence's testimony.

Mr. Pence separately opposed the subpoena on the grounds that, as vice president, he served also as president of the Senate—a role, his lawyers argued, that enabled him to invoke a constitutional protection that generally shields members of Congress from being questioned about their legislative activities.

A federal judge rejected Mr. Trump's executive privilege claims in March and ordered Mr. Pence to testify. But Judge James Boasberg sided in part with Mr. Pence's arguments under the Constitution's Speech or Debate Clause, ruling that he could decline to answer some questions relating to his role as president of the Senate during the certification of Joe Biden's victory.

Judge Boasberg handed down the ruling in his initial weeks as chief judge of the federal trial court in Washington, where he presides over grand jury-related disputes. Mr. Pence opted against appealing, with a spokesman saying that the "landmark and historic ruling affirmed for the first time in history that the Speech or Debate Clause extends to the vice president of the United States."

Mr. Trump asked the D.C. Circuit to block the ruling pending his appeal, which the three-judge panel declined to do on Wednesday.

For Mr. Trump, Wednesday's ruling added to a string of defeats. The court previously rejected Mr. Trump's executive-privilege claims and compelled top aides, including former White House chief of staff Mark Meadows, to testify in the investigation into efforts to keep the former president in power.



Laura Jeanne Penrod, a Las Vegas teacher, doesn't support equitable grading, which aims to measure knowledge by the end of a term without penalties for behavior.

Schools Ditch Homework, Deadlines

By SARA RANDAZZO

Las Vegas high-school English teacher Laura Jeanne Penrod initially thought the grading changes at her school district made sense. Under the overhaul, students are given more chances to prove they have mastered a subject without being held to arbitrary deadlines, in recognition of challenges some children have outside school.

Soon after the system was introduced, however, Ms. Penrod said her 11th-grade honors students realized the new rules minimized the importance of homework to their final grades, leading many to forgo the brainstorming and rough drafts required ahead of writing a persuasive essay. Some didn't turn in the essay at all, knowing they could redo it later.

"They're relying on children having intrinsic motivation, and that is the furthest thing from the truth for this age group," said Ms. Penrod, a teacher for 17 years.

The Clark County School District where Ms. Penrod works—the nation's fifth-largest school system—has joined

dozens of districts in California, Iowa, Virginia and other states in moves toward "equitable grading" with varying degrees of buy-in. Leaders in the 305,000-student Clark County district said the new approach was about making grades a more accurate reflection of a student's progress and giving opportunities to all learners.

Different forms

Equitable grading can take different forms, but the systems aim to measure whether a student knows the classroom material by the end of a term without penalties for behavior, which, under the theory, can introduce bias. Homework is typically played down and students are given multiple opportunities to complete tests and assignments.

Proponents of the approach, including paid consultants, say it benefits students with after-school responsibilities, such as a job or caring for siblings, as well as those with learning disabilities. Traditional grading methods, they say, favor those with a stable home life and

more hands-on parents.

"We're giving children hope and the opportunity to learn right up until [the class is] officially over," said Michael Rinaldi, the principal at Westhill High School in Stamford, Conn., where a group of teachers began exploring different grading systems four years ago.

In Las Vegas, some teachers and students say the changes have led to gaming the system and a lack of accountability.

"If you go to a job in real life, you can't pick and choose what tasks you want to do and only do the quote big ones," said Alayson Henderson, a high-school English teacher there. Lessons drag on now, she said, because students can turn in work until right before grades are due.

"We're really setting students up for a false sense of reality," Ms. Henderson said.

Equitable grading still typically awards A's through F's, but the criteria are overhauled. Homework, in-class discussions and other practice work, called formative assessments, are weighted at between 10% and 30%. The bulk of a grade is earned through what are

known as summative assessments, such as tests or essays.

Extra credit is banned—no more points for bringing in school supplies—as is grading for behavior, which includes habits such as attendance.

High floor

The scale starts at 49% or 50% rather than zero, meant to keep a student's grade from sinking so low from a few missed assignments that they feel they can't recover and give up.

Samuel Hwang, a senior at Ed W. Clark High School in Las Vegas, has spoken out against the grading changes, saying they provide incentives for poor work habits. A straight-A student headed to the University of Chicago next year, Samuel said even classmates in honors and Advanced Placement classes are prone to skip class now unless there is an exam.

"There's an apathy that pervades the entire classroom," he said.

Clark County Superintendent Jesus Jara told the school board last fall that successfully shifting the system will

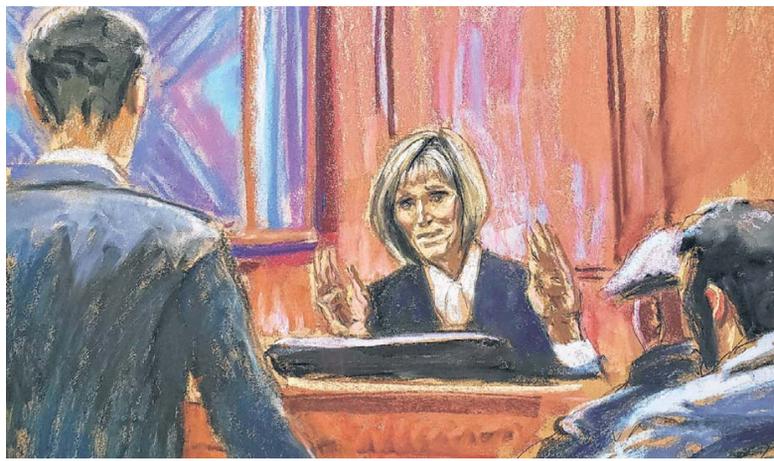
take years, as the district's 18,000 teachers shed the traditional grading mind-set.

Erin Spata, a science teacher at Westhill High in Connecticut who favors the change, said her students are moving away from constantly asking how many points an assignment will be worth and instead understand the importance of practice work, whether or not it is counted toward the final grade.

Sarah Lloyd, a middle-school science teacher in Los Angeles, has spent two years studying equitable grading and is still working on the right balance between giving students space to be self-paced and keeping her science lessons moving. "You have to teach differently," she said. Her students are starting to "value learning more than points" and have less test anxiety, she said.

Ms. Lloyd said she understood why teachers push back against mandated grading changes.

"I think that it is easier to convert people incrementally," Ms. Lloyd said. "It's not something you can shift all at once."



E. Jean Carroll is seeking damages against the former president for alleged battery and defamation.

Writer Testifies Trump Raped Her at Store in 1990s

By JENNIFER CALFAS AND CORINNE RAMEY

Writer E. Jean Carroll testified in graphic detail that she was raped by Donald Trump in the 1990s, telling a federal jury the alleged assault in a New York department store scarred her over the decades since.

The columnist took the witness stand Wednesday in Manhattan as part of her civil lawsuit seeking damages against the former president for battery and defamation.

"I'm here because Donald Trump raped me and when I wrote about it he said it didn't happen," Ms. Carroll, 79 years old, said. "He lied and shattered my reputation. I'm here to try and get my life back."

Hours before Ms. Carroll began her testimony, Mr. Trump, who has denied the allegations, published a pair of posts on his social-media site that claimed the writer's lawsuit was a political hit job. In one post he said,

"Nobody saw this? She never made a police complaint?"

U.S. District Judge Lewis Kaplan, who is presiding over the trial, expressed concern about Mr. Trump's comments and warned that similar future conduct could place the former president in legal jeopardy. Judge Kaplan said Mr. Trump's efforts could be viewed as an attempt to influence the jury.

Trump lawyer Joe Tacopina said he would speak to Mr. Trump, who didn't appear in court, "and ask him to refrain from any further posts regarding this case."

Ms. Carroll has filed a pair of lawsuits against Mr. Trump. The trial centers on a complaint she filed in November, when a New York law went into effect that gave alleged survivors of long-ago sexual assault a new, one-year opportunity to file lawsuits.

Ms. Carroll, a former columnist for Elle magazine, made her allegation against Mr.

Trump in a book she published in 2019. She recounted the allegations for the jury, saying he raped her at Bergdorf Goodman in New York City.

The two had met years earlier at a party, she testified, and Mr. Trump recognized her at the store. She testified that Mr. Trump asked her for help choosing a gift. The two chatted, looking for gifts, she said. Mr. Trump suggested going to the store's lingerie section. Ms. Carroll said they joked about who should try on a see-through bodysuit once they were in the section, where, she said, she didn't see store employees. They then went to the dressing room and there, she said, Mr. Trump assaulted her.

Ms. Carroll said she confided in two friends about the alleged incident but never reported it to police or spoke publicly about it for decades. She said she feared retaliation from Mr. Trump, was worried about losing her job and felt ashamed.

Tennessee Ban on Trans Youth Care Challenged

By MARIAH TIMMS

The Justice Department filed a lawsuit Wednesday challenging Tennessee's recent ban on certain healthcare for transgender minors, arguing the law violates the constitutional guarantee of equal protection.

The suit targets a law signed last month by Tennessee's Republican Gov. Bill Lee. Under the measure, doctors are prohibited from providing certain treatments to anyone under 18 even with parental consent if the procedure is used as part of transgender healthcare. The restrictions include a block on prescribing medications that can delay the onset of puberty or hormones that can cause physical changes such as the development of facial hair or breasts. The law also requires physicians to discontinue current gender-transition care of minor patients by March 2024.

The department's complaint argued the ban unlawfully interferes with medically necessary care for transgender minors, including those treated for gender dysphoria. The gov-

ernment's filing joined with a lawsuit filed last week by several families and a medical provider, represented by the American Civil Liberties Union and others. The Justice Department is asking a judge to issue a preliminary injunction to block the state from enforcing the law, set to go into effect on July 1.

"No person should be denied access to necessary medical care just because of their transgender status," said Assistant U.S. Attorney General Kristen Clarke, head of the Justice Department's civil rights division.

Tennessee Attorney General Jonathan Skrmetti said the federal government had "joined the ACLU and an elite New York law firm in attacking a bipartisan law that protects children from irreversible harm. I welcome the opportunity to litigate these issues and vigorously defend Tennessee's law."

Supporters of Tennessee's law say that it keeps children safe from untested medical procedures and potential abuse. Similar measures have been enacted by other Republican-led legislatures, including in Utah and South Dakota.

Montana Lawmaker Barred From Floor

Montana's House of Representatives voted to bar a transgender Democratic lawmaker from participating in debate from the floor a week after she spoke out against a bill that would ban gender-affirming therapies for minors.

The Republican-controlled chamber Wednesday voted 68-32 to no longer admit Zoey Zephyr to the House floor for the rest of the session. She will

be able to vote remotely.

Republican Rep. Sue Vinton, the House Majority Leader who introduced the motion, said Ms. Zephyr had encouraged disruption of the session and didn't comply when told to come to order and clear the floor by the House speaker.

Last week, Ms. Zephyr told colleagues they would "have blood on their hands" if they voted for a bill banning gender-affirming surgeries and treatments for minors in the state.

The legislation was passed by the House.

—Talat Ansari

U.S. NEWS

Economic Crosswinds Color Biden's Campaign

By HARRIET TORRY AND ROSIE ETTENHEIM

President Biden launches his re-election campaign facing voters soured on a U.S. economy with high inflation, climbing interest rates and a strong but cooling labor market.

By several measures, the economy is better for many Americans since Mr. Biden took office amid its rebound from the short but severe pandemic-driven recession of 2020. Unemployment has fallen since he was inaugurated on Jan. 20, 2021, amid robust job growth and rising wages. That helped fuel strong consumer spending, though broader economic growth has been uneven.

Here is a snapshot of the economy, according to data from the Labor, Commerce and Treasury departments, the Federal Reserve, the Congressional Budget Office and the National Bureau of Economic Research.

Inflation

U.S. inflation rocketed during the pandemic, pushed higher by factors including supply-chain bottlenecks, a worker shortage, government stimulus and pent-up consumer demand for services such as travel and dining out as the economy reopened. The infla-

tion rate—as measured by the 12-month change in the consumer-price index—eased to 5% in March from a recent peak of 9.1% in June 2022, but remains well above the 1.4% rate in January 2021, when Mr. Biden took office.

Rising grocery and restaurant prices have been particularly painful for household budgets, with food costs up 18.3% in March from January 2021.

The average pump price of a gallon of regular gasoline on Tuesday, at \$3.66, was down from the record high of \$5.02 a gallon on June 14, 2022, but is up from \$2.39 on Jan. 20, 2021, according to OPIS, an energy-data and analytics provider.

Labor market

Unemployment declined to 3.5% last month, near a 50-year low, from 6.3% in January 2021 and a pandemic high of nearly 15% in April 2020. Employers have added 12.6 million jobs since January 2021. That lifted the nation's total payrolls above their prepandemic level by the middle of last year.

One factor driving wage gains but plaguing employers has been a chronic worker shortage in many fields since pandemic lockdowns eased. The number of job openings, at

9.9 million in February this year, exceeded the number of unemployed Americans by about 4 million. When Mr. Biden took office in January 2021, the situation was reversed: There were about 3 million more job seekers than job openings, at 7.2 million.

Wages

Wage gains, though rapid, haven't kept pace with inflation since Mr. Biden took office. Average hourly earnings for all private employees, adjusted for seasonality, were up nearly 11% in March of 2023 from January 2021—less than the CPI's nearly 15% rise in the same period.

Workers in the lower half of the income distribution saw higher rates of wage growth than those in the upper half.

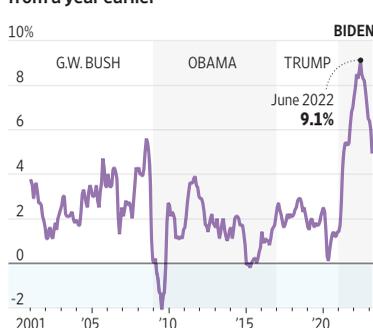
Wealth

Americans' total wealth soared in the wake of Covid-19, as stocks and property values rose and households paid down debt during the pandemic lockdowns.

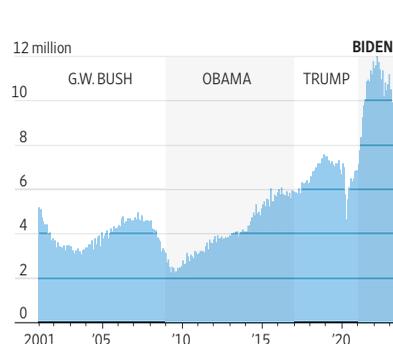
Household net worth rose 8%, from the first quarter of 2021 to the fourth quarter of last year, the latest for which there are Fed data.

—James Benedict contributed to this article.

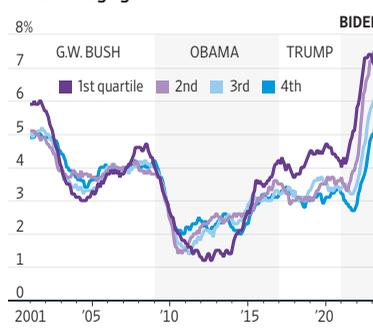
Consumer-price index, change from a year earlier



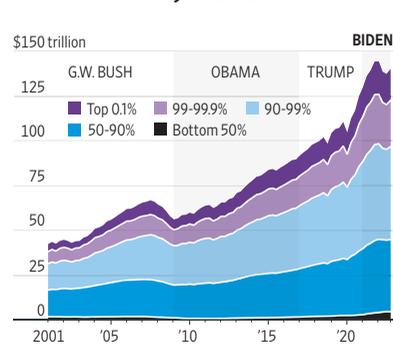
Job openings



12-month moving averages of monthly median wage growth*



Household wealth by wealth distribution



*The lowest 25% of average wages are in the 1st quartile and those in the highest 25% of average wages are in the 4th quartile. Sources: Labor Department (CPI); Labor Department via Federal Reserve Bank of St. Louis (job openings); Current Population Survey; Bureau of Labor Statistics; Federal Reserve Bank of Atlanta calculations (wage growth); Federal Reserve (household wealth)

Debt-Limit Bill Passes The House

Continued from Page One fiscal policy.

Mr. McCarthy said Mr. Biden is "putting the American economy in jeopardy by his lack of action. Now he should sit down and negotiate."

Rep. Hakeem Jeffries of New York, the House Democratic leader, said that Republicans had produced not a budget but a ransom note.

"Effectively what you are saying is 'pass our extreme, MAGA Republican bill or else America is going to default,'" he said before the vote.

The White House has said that Congress should simply raise the ceiling—leaving unclear when and if any discussions would begin. Mr. Biden and Mr. McCarthy met in early February but haven't met since, and no formal discussions have been disclosed.

"I'm happy to meet with McCarthy, but not on whether or not the debt limit gets ex-

tended. That's not negotiable," Mr. Biden said Wednesday. After the vote, White House press secretary Karine Jean-Pierre said that Republicans "must act immediately and without conditions to avoid default." The White House and congressional Democrats have called the GOP bill a reckless effort to extract concessions.

The U.S. bumped up against the debt limit in January but has been using special accounting maneuvers since then to avoid breaching the debt ceiling. How long it can keep deploying those strategies is uncertain, with forecasters expecting them to be exhausted this summer, perhaps as early as June. If the debt ceiling isn't raised, the U.S. could default on debt payments and other obligations.

Concerns about the debt ceiling are already surfacing in the market for short-term Treasury bills—government debt at risk of a lapsed payment if Congress doesn't act before the Treasury runs out of borrowing room. Investors are hoarding T-bills that they believe will come due before the so-called X date and avoiding paper that matures mid-summer, when many Wall Street analysts believe the

ceiling would prevent further debt sales. That trading has created some of the largest distortions in short-term Treasury-bill pricing in records going back decades.

Most investors believe the Treasury would eventually pay back the money it owes. But investors fear that even temporary payment disruptions could wreak havoc on multi-trillion-dollar markets that

banks and companies rely on to fund their daily operations.

Both parties expressed urgency over the threat, but there was no immediate path forward toward averting a crisis. It is unknown whether conservative Republicans would be willing to accept a debt-ceiling increase with little or no spending cuts, or whether Mr. Biden or Democratic lawmakers would make any con-

cessions to close a deal.

"The speaker should drop the brinkmanship, drop the hostage taking, come to the table with Democrats to pass a clean bill to avoid default," said Senate Majority Leader Chuck Schumer (D., N.Y.).

Sen. Mitch McConnell of Kentucky, the chamber's GOP leader, urged talks between Messrs. McCarthy and Biden, saying the speaker "has done an excellent job of unifying our side."

On Tuesday, Treasury Secretary Janet Yellen said a failure to raise the debt limit would have lasting negative consequences, including higher interest rates, which would make it more expensive for businesses to expand or households to buy a car or a house.

"A default on our debt would produce an economic and financial catastrophe," she said in a speech. "A default would raise the cost of borrowing into perpetuity."

The Republicans' bill would raise the debt ceiling until March 31, 2024, or until the national debt increases by \$1.5 trillion, whichever comes first. On the spending side, it would return the government's discretionary spending to fiscal year 2022 levels and cap an-

nual spending growth at 1% for a decade, as well as roll back various Biden administration policies.

GOP lawmakers said the cuts were needed after years of large annual deficits and a mounting federal debt.

"If we fail to meet this moment, we risk being the first generation in history to leave our children a weaker America with fewer opportunities and a lower standard of living," said Rep. Jodey Arrington (R., Texas), chairman of the House Budget Committee.

Republicans made changes to their proposal to try to address concerns of holdout lawmakers. They canceled additional provisions in Mr. Biden's Inflation Reduction Act related to climate and energy.

Lawmakers also softened their planned changes related to tax credits on clean fuels to address complaints from Midwestern Republicans.

Ahead of the changes, the nonpartisan Congressional Budget Office said the GOP proposal would cut government deficits by \$4.8 trillion over 10 years.

—David Harrison, Richard Rubin, Natalie Andrews and Eric Wallerstein contributed to this article.



Speaker Kevin McCarthy talked to reporters on Wednesday.

SPACs Are Running Out of Cash

Continued from Page One

with its Canadian partner.

Many of these businesses were worth billions of dollars when they hit the market and drew in small investors excited at the prospects of space tourism, cryptocurrencies and electric cars. Companies that went public this way have since collectively lost more than \$100 billion in market value.

Richard Branson's Virgin Orbit Holdings Inc. is the latest big name to go bankrupt. The satellite-launch startup was valued above \$3 billion and backed by investors including Boeing Co. when it went public at the end of 2021.

SPAC deals were supposed to provide a big lift for young companies, giving them cash and a stock-market listing. Instead, they put them under pressure to deliver and left them vulnerable to rising interest rates and the vagaries of public markets.

"That lifeline pulling them up was actually a hand on the neck to further their death," said Julian Klymochko, who manages a SPAC-focused fund at Accelerate Financial Technologies.

First-quarter earnings reports coming in the next few weeks could be a tipping point for many companies. The reports are expected to show declining cash and little chance of turning profits quickly enough to avoid a bust.

Using figures from data providers SPAC Research and FactSet, the Journal analyzed 342

companies that did SPAC deals between 2016 and 2022 and filed a quarterly or annual report in the past three quarters with the Securities and Exchange Commission. Some 101 companies could run out of cash within a year based on how much they reported spending on operating activities, the Journal's analysis shows. On average, they have enough cash and short-term investments to cover spending for about five months. More than 90 companies in the analysis had positive cash flows from operations during their most recent reporting

period, meaning they were likely accumulating cash.

Bird was once valued at \$2 billion by venture capitalists shortly after its creation in 2017 and reached that mark again in its 2021 SPAC deal. The company has been hit hard by rising costs and warned in November that it could soon file for bankruptcy. In early January, it raised about \$30 million in convertible notes and money from top executives by merging with its Canadian partner. A spokeswoman said the recent funding should help Bird build a self-sustaining business.

Many of the companies can raise cash only by giving up some control, raising expensive debt or pledging their most valuable assets, bankers and advisers said. "The financings that are available to these failing companies are just going to accelerate their demise," said Adam Epstein of Third Creek Advisors LLC, who works with startups.

Many of the companies are slashing expenses. Owllet cut about half of its 200 employees last year as it struggled to respond to a Food and Drug Administration warning letter

about its marketing of its smart-sock baby monitors and cash dwindled. The company declined to comment.

Also called a blank-check company, a SPAC raises money from investors, then lists on a stock exchange with the sole intent of merging with a private company to take it public. Merging with SPACs allowed companies to make business projections to individual investors that wouldn't have been allowed in traditional initial public offerings.

Virgin Orbit told investors that by 2023 sales would

surge above \$300 million and operating expenses would fall. Instead, a failed launch left the company with few options to raise the cash it needed.

Faraday Future is also in need of funding after repeatedly pushing back the delivery date of its initial electric vehicle. The company had about \$30 million in cash as of April 11, it said. The luxury-car maker previously promised it would grow sales at a record pace, faster than tech giants such as Google parent Alphabet Inc. after it began making cars. A spokesman said the company is in talks with potential investors.

Electric-van maker Arrival SA made a similar sales-growth pledge but is also low on cash. The company said it would do a reverse stock split and try to raise funds by merging with another SPAC, two years after completing its initial blank-check merger. Arrival declined to comment.

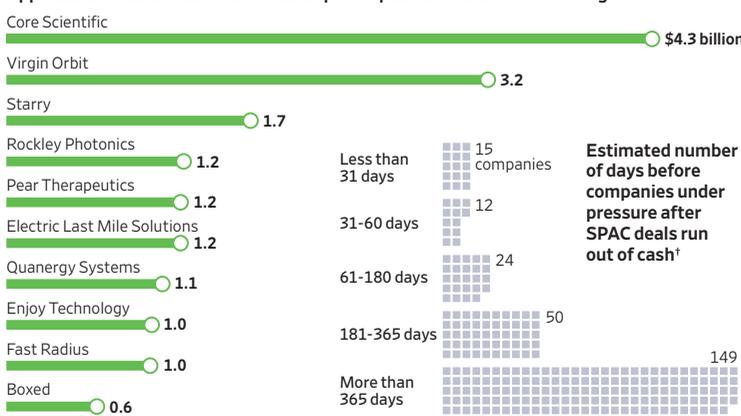
Only about 15% of the companies that did SPAC deals during the record year of 2021 were profitable, compared with 30% of SPACs that went public from 2013 to 2020, according to data compiled by Jay Ritter, a finance professor at the University of Florida's Warrington College of Business.

Many companies have been acquired or taken private at low valuations in recent months to stave off bankruptcy. Shell PLC said early this year it would acquire charging firm Volta Inc. at 86 cents a share, a price that is more than 90% lower than its SPAC deal valuation of 2021.

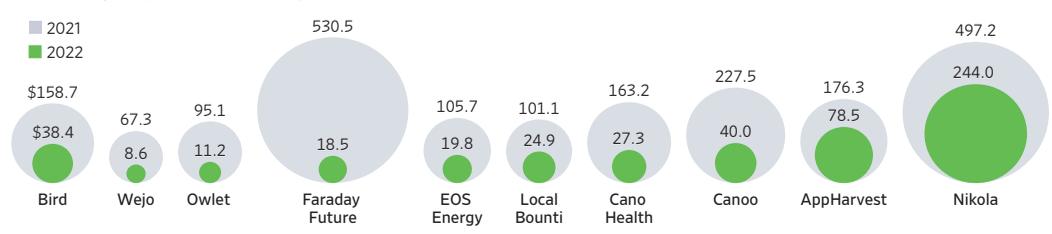
Others to file for bankruptcy in recent months include bitcoin miner Core Scientific Inc., grocery courier Boxed Inc. and sensor technology startup Quanergy Systems Inc.

—Mike DeStefano and Tom McGinty contributed to this article.

Approximate valuations of now-bankrupt companies at time of SPAC merger*



Cash holdings by year for select companies that did SPAC deals, in millions†

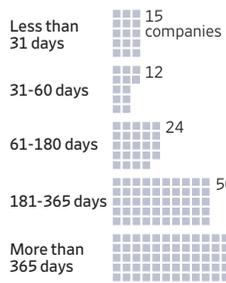


*Valuations are based on total enterprise value, which includes debt but excludes cash holdings. †Includes other short-term investments. Sources: SPAC Research (valuations); Wall Street Journal analysis of FactSet data (number of days); the companies, FactSet (cash holdings); FactSet (performance)

Performance since the start of 2021 for companies that did SPAC deals vs. Russell 2000



Estimated number of days before companies under pressure after SPAC deals run out of cash†



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U.S. NEWS

Leak Suspect Still a Security Risk, U.S. Says

BY SADIE GURMAN AND JON KAMP

The Massachusetts Air National Guardsman charged with taking and sharing highly classified intelligence documents might still have access to sensitive material that could aid foreign adversaries, federal prosecutors said Wednesday in court filings seeking his continued detention.

Airman First Class Jack Teixeira, who has been jailed since his arrest earlier this month, "accessed and may still have access to a trove of classified information that would be of tremendous value to hostile nation states that could offer him safe harbor and attempt to facilitate his escape from the United States," prosecutors said late Wednesday in a filing.

Investigators are still trying to determine whether Airman Teixeira kept any classified information that hasn't surfaced publicly, the filing said.

"In this effort, the Defen-

dant has a head-start on the government," prosecutors wrote. "The Defendant knows where the information is. He knows how to access it. And based on his specialized IT skills, he presumably knows how to disseminate that information without being immediately noticed."

The 18-page document outlined arguments prosecutors intend to present during a Thursday detention hearing for Airman Teixeira, 21 years old, at a federal courthouse in Worcester, Mass.

Airman Teixeira's public defenders didn't respond to requests for comment. Defense attorneys indicated they would seek to have Airman Teixeira released to his father's home, prosecutors said.

Prosecutors called Airman Teixeira a national-security risk and said he took steps to conceal the scope of the material he obtained and the people with whom he shared it. They said he destroyed a tab-



Jack Teixeira

let, laptop and gaming console, and told people in an online chat room where he allegedly posted the classified documents to delete all messages and remain silent.

Airman Teixeira is charged with unauthorized retention and transmission of national defense information and unauthorized removal and retention of classi-

fied documents or material. He hasn't yet entered a plea.

The extraordinary leak sent the U.S. government scrambling to protect its secrets and exposed details of U.S. surveillance of adversaries and allies, touching off diplomatic storms with U.S. partners and raising worries about undermining Ukraine's fight against Russia.

The Pentagon and intelligence agencies have moved in recent days to tighten access to classified information. As part of the continuing fallout, both the operational commander and the administrative commander of Airman Teixeira's unit, the 102nd Intelligence Support Squadron based at Otis Air National Guard Base on Cape Cod, were suspended on Wednesday "pending further investigation into the unauthorized disclosure of classified information," an Air Force spokeswoman said.

The classified documents were posted first on Discord, a social-media platform popular

with gamers, and then on other online forums.

"The nature of the materials that the Defendant accessed—not all of which have been publicly surfaced—have the capacity to cause additional exceptionally grave damage to the U.S. national security if disclosed," prosecutors said.

Airman Teixeira began posting sensitive material online as early as December, according to charging documents. The new filing said the airman, who worked in tech support, had begun accessing hundreds of classified documents in February 2022.

Prosecutors also said the information Airman Teixeira accessed "far exceeds what has been publicly disclosed on the internet to date."

Investigators identified him as the suspect with the help of billing records from Discord and through interviews with at least one other member of the small, tight-knit group that the guardsman allegedly led

on that platform.

The new filing says he acknowledged in social media posts that he was sharing classified information from intelligence agencies and encouraged other users to request information they wanted to see.

Prosecutors said Airman Teixeira has a history of making comments about shootings and violence and maintained a cache of firearms.

When FBI agents searched two homes he used this month, they found a locker full of weapons, including handguns, rifles, shotguns, "an AK-style high-capacity weapon, and a gas mask," the document says. They also found a bazooka, ammunition and a silencer, among other items prosecutors said show he may pose a danger.

Airman Teixeira told other social media users earlier this year he would conduct a shooting in a "crowded urban or suburban environment," prosecutors said.

Veterans' Burn-Pit Claims Hit 500,000

BY BEN KESLING

Veterans have filed half a million claims for benefits stemming from toxic exposure while serving, the Department of Veterans Affairs said Wednesday, part of the largest expansion of VA coverage in a generation.

The many claims come after the VA and veteran-service organizations let veterans know about benefits and healthcare coverage for those exposed to burn pits, radioactive material, herbicides and other toxins after passage last summer of the PACT Act. The bipartisan legislation was launched in response to criticisms that the Defense Department and VA hadn't done enough to recognize the effects of burn pits and other toxic exposures or to fund research and treatment of those who had been exposed.

The VA has awarded more than \$1 billion in benefits to veterans and survivors who filed PACT Act-related claims, the agency said.

"I will give the VA credit for leaning into asking veterans for claims," said Allison Jaslow, chief executive of the Iraq and Afghanistan Veterans of America, an advocacy group. "They could have slow-rolled it out of concerns about capacity."

The VA has screened three million veterans for toxic exposure, with more than 40% saying they were concerned that they had been exposed.

Activision Purchase Is Imperiled

Continued from Page One space," said Damien Geradin, a Brussels and London-based competition lawyer with Geradin Partners. "The mood has changed."

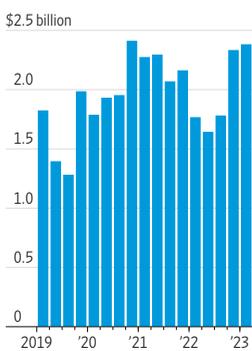
Britain was once a wallflower in regulating big, international tie-ups. It has emerged more recently as one of the most aggressive in terms of policing global transactions since its divorce from the EU, which in the past had taken the lead in Europe.

The companies defended their deal and said they would continue to fight. Antitrust lawyers said appeals can move relatively quickly in the U.K., but the threshold for overturning a CMA ruling is high. An appeals tribunal looks only at whether a decision was legal and rational and whether proper procedure was followed.

Microsoft Vice Chair and President Brad Smith said it remains fully committed to the acquisition. He said the ruling would discourage technology innovation and investment in the U.K. "We're especially disappointed that after lengthy deliberations, this decision appears to reflect a flawed understanding of this market and the way the relevant cloud technology actually works," Mr. Smith said.

Activision Chief Executive Bobby Kotick said the CMA decision, if it holds, "would stifle investment, competition, and job creation throughout the U.K. gaming industry." He said

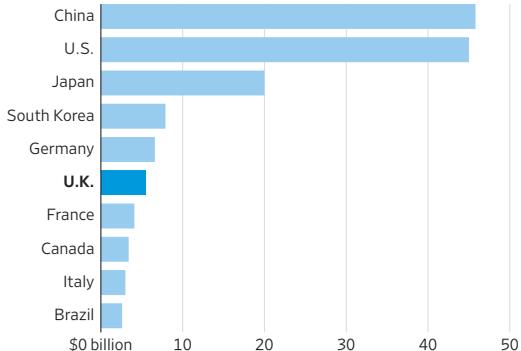
Activision Blizzard quarterly revenue



2022 estimated global games market: \$184.4B*

Category	Revenue (Billion)
Mobile	\$92.2B
Console	\$51.8B
PC	\$38.2B
Browser	\$2.3B

Top countries by estimated gaming revenue, 2022*



*Figures don't total due to rounding. For physical/digital games, in-game spending and subscription services. Excludes taxes, secondhand markets, advertising, hardware, B2B services, and online gambling. Sources: S&P Capital IQ (quarterly revenue); FactSet (performance); Newzoo (gaming revenue)

told employees that Activision, alongside Microsoft, will contest the decision: "This isn't the news we wanted—but it is far from the final word on this deal."

Microsoft now faces a sudden challenge to its videogaming ambitions. It has been

Share performance, year to date



pushing to get approvals for the deal—which would be its biggest ever—for more than a year in part to help it gain an edge in the nascent market for cloud gaming, the Netflix-like streaming of games.

Microsoft also wanted to use the deal to grow its mar-

ket share in mobile gaming, where it has a minimal presence. Activision owns "Candy Crush," one of the most lucrative mobile franchises, and mobile games generate more annual revenue globally than both console and computer games, according to industry tracker Newzoo BV.

Without Activision, Microsoft would be left with few comparable acquisition opportunities. Microsoft could seek out smaller acquisition targets, analysts said, though that might not provide the large portfolio of hit games it needs to thrive in cloud gaming.

For Activision, a failed deal would leave it as an independent company and could turn it into a buyer, instead of a seller, analysts said.

The maker of hit videogame series such as "Call of Duty" and "World of Warcraft" would get a \$3 billion breakup fee from Microsoft if the deal falls apart because of anticompetition reasons. It reported double-digit percentage growth in revenue and profit in the first quarter on Wednesday.

Activision shares fell more than 11% on the CMA's ruling Wednesday. Microsoft shares, fueled by a stronger-than-expected earnings report late Tuesday, rose more than 7%.

The planned deal has helped buoy Activision shares during a period when many gaming and other tech stocks have struggled. Some of the earlier pressure behind Activision's rationale to do the deal has also faded, according to analysts.

Allegations of a toxic workplace at the company and their effect on employees under Mr. Kotick served as a catalyst for the deal, The Wall Street Journal previously reported. Activision denied the claims and has said it is working to become

the most inclusive company in the videogaming industry. Even so, before the Microsoft bid, investors had fled, staff morale had sagged and some board members had started to get anxious about the company's leadership. Analysts expect Mr. Kotick to stay in charge if a deal fizzles.

Company efforts to bolster governance, its strong growth and time could help lift morale at Activision if it remains a stand-alone company, said TD Cowen analyst Doug Creutz. "The company has had over a year to address issues that caused this in the first place," said Mr. Creutz.

Microsoft now faces a sudden challenge to its videogaming ambitions.

Microsoft announced its plans to buy Activision in January 2022 and valued the deal at \$69 billion after adjusting for the videogame publisher's net cash. The companies had planned to close the transaction by the middle of this year.

The European Commission, the EU's antitrust watchdog, has set a deadline of May 22 for its own ruling. The FTC, which sued Microsoft to block the deal in December, has scheduled a hearing for the case in its administrative court for August.

While the CMA approves a majority of the deals it investigates, it has developed a reputation for taking a more heavy-handed approach than its peers recently, legal experts said.

—Dave Michaels
contributed to this article.

U.S. WATCH

MONTANA

Governor Seeks to Widen TikTok Ban Bill

Montana's governor is asking legislators to make changes to a bill that would be the first in the U.S. to ban TikTok outright, according to a draft of the amended bill language viewed by The Wall Street Journal.

The changes would broaden the ban from applying specifically to TikTok, which is owned by China-based ByteDance Ltd., and cover social-media applications that provide certain data to foreign adversaries, according to the proposed bill language.

State legislators approved the bill that would ban TikTok on all devices in Montana this month. The bill is in the process of being transmitted to Republican Gov. Greg Gianforte, who can either veto the bill, sign it into law or not take any action. If he doesn't take action, the bill would automatically become law after 10 days.

The bill, in its current state, was expected to face legal challenges on several fronts, including First Amendment rights, interstate commerce and bill of attainder laws, which prevent the government from declaring an entity guilty of a crime without first going through a trial process.

TikTok didn't respond to a request to comment.

The governor's legislative changes would retain the current bill's Jan. 1 start date for the ban to go into effect.

—Meghan Bobrowsky



UNAFAID: The Susan and Peter J. Solomon family Insectarium room captured the attention of a visitor at the Richard Gilder Center for Science, Education and Innovation, which was inaugurated Wednesday at the American Museum of Natural History in New York City.

GEORGIA

New Law Increases Gang-Crime Penalties

Gov. Brian Kemp signed into law tougher penalties for gang crimes Wednesday, one of his top legislative priorities after the

Republican put fighting crime at the forefront of his re-election campaign last year.

The measure adds a mandatory five years to prison sentences for anyone convicted of a gang crime and 10 years for anyone convicted of recruiting minors into a gang.

"We're helping to disrupt their recruitment efforts, and we will not let up until gangs in Georgia are completely gone," Mr. Kemp said.

The law, which goes into effect July 1, reverses a trend in Georgia championed by Mr. Kemp's predecessor, Republican

Gov. Nathan Deal, of reducing mandatory sentences or refusing to add new ones.

Democrats opposing the measure said long prison terms would be expensive for taxpayers, despite little proof that they sway anyone from committing a crime.

—Associated Press

MASSACHUSETTS

Academic With China Ties Avoids Prison

Former Harvard professor Charles Lieber was sentenced to six months of home confinement and two years of supervised release after being found guilty in 2021 of federal charges stemming from payments he received from a Chinese government talent program.

Mr. Lieber, who long held joint appointments in Harvard University's chemistry and engineering departments and is a renowned expert in the field of nanoscience, was convicted in December 2021 at trial in federal court in Boston.

He stood accused of lying to federal government investigators about his participation in the Chinese government's Thousand Talents program aimed at cultivating foreign scientific and technical experts; failing to disclose cash payments from the program on his income tax returns; and concealing the existence of a Chinese bank account.

As part of the sentence handed down by a federal judge in Boston on Wednesday, Mr. Lieber will also have to pay a fine of \$50,000 and make a \$33,000 restitution payment to the Internal Revenue Service.

Mr. Lieber's attorneys asked for a sentence of no jail time. They noted that he is battling follicular lymphoma, a type of blood cancer, and has lost professional and reputational status.

—Byron Tau



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WORLD NEWS

Xi Calls Zelensky; Will Send Envoy

Talk follows Chinese leader's meetings with Putin, as Beijing seeks role in peace effort

By AUSTIN RAMZY

Chinese leader Xi Jinping called Ukrainian President Volodymyr Zelensky on Wednesday, their first conversation since the Russian invasion more than a year ago, as Beijing attempts to portray itself as a potential peacemaker in the conflict.

China's Foreign Ministry said it would send a special representative for Eurasian affairs to Ukraine and other countries "for in-depth communication with all parties on the political settlement of the Ukrainian crisis."

Mr. Zelensky said the two leaders discussed ways to work together toward a "just and sustainable peace" for Ukraine during the hourlong conversation. He insisted that any settlement with Moscow must be based on the restoration of Ukraine's borders to their status in 1991. "There can be no peace that is based on territorial compromises," he said, according to his office's account of the call.

In 2014, Russia annexed the Crimean Peninsula and took control over a swath of territory in eastern Ukraine.

Mr. Zelensky said the call, as well as the appointment of a Ukrainian ambassador to China on Wednesday, would help develop ties between the two countries. A presidential decree on Wednesday appointed Pavlo Riabikin, who was Ukraine's minister of strategic industries, as ambassador to China. For the past two years, Ukraine has been represented in China by a chargé d'affaires.

"Now that the number of rational thoughts and voices is increasing, all parties should seize the opportunity to accumulate favorable conditions for a political solution to the crisis," Mr. Xi told Mr. Zelensky, according to the Chinese Foreign Ministry's account of the conversation.

The call followed Mr. Xi's three-day trip last month to Russia, where he and Russian President Vladimir Putin deepened their nation's political and economic ties, and their longstanding personal friendship in their 40th meeting as leaders.

Mr. Putin praised China's peacemaking initiative, saying many parts of it were "consonant with Russian approaches."

China's initiative, outlined in a 12-point position paper, has been largely dismissed by the U.S. and Europe, with officials saying China appears to heavily favor Russia's position. Beijing has accused the U.S. of



Volodymyr Zelensky spoke with President Xi for about an hour.

fueling the conflict by providing arms to Ukraine and rejecting Chinese efforts at a deal.

Ukrainian officials have been cautious, welcoming the first point of China's initiative, which calls for the sovereignty and territorial integrity of all countries to be upheld, but not touching upon the rest.

Dmytro Kuleba, the Ukrainian foreign minister, emphasized Ukraine's own peace proposal during a telephone call last month with his Chinese counterpart, Qin Gang. That plan includes demands for the restoration of Ukraine's borders and removal of all Rus-

sian troops—points not made in China's position paper.

Some of China's other points, such as the view that no country's security efforts should come at the expense of its neighbors and criticism of reliance on security blocs, echo the Kremlin's arguments for its invasion. The paper also criticizes unilateral sanctions, which the U.S., Europe and other countries have used to punish Russia.

The White House said the Xi-Zelensky call was overdue, though whether it would lead to meaningful peace negotiations is largely up to Ukraine. "We believe it's important

for President Xi and PRC officials to avail themselves of the Ukraine perspective on this illegal, unprovoked invasion by Russia," National Security Council spokesman John Kirby said, referring to the People's Republic of China. To the degree the call did that, he said, "that's a good thing."

Some analysts have described China's Ukraine overture as cover for deepening its relationship with Russia. Messrs. Xi and Putin declared their countries had a "no limits" friendship shortly before Moscow launched the Ukraine war.

Mr. Xi's efforts likely will find more support in the developing world, where views on the war are more mixed and tolerance of Russia's actions is greater than in the West.

Mr. Zelensky said in March that he hoped to meet with Mr. Xi. China hasn't publicly responded to that offer, and Wednesday's statement by China's Foreign Ministry didn't mention any such plans.

—Bojan Pancevski, Isabel Coles and Georgi Kantechev contributed to this article.

Watch a Video



Scan this code for a video on Xi's efforts at peacemaking in Ukraine.

Putin Critic Fears Life Sentence in New Case

By ANN M. SIMMONS

Jailed Russian opposition politician Alexei Navalny said he is facing a terrorism charge that could leave him in prison for the rest of his life as the Kremlin extends a sweeping crackdown on its critics.

Mr. Navalny, long one of Russian President Vladimir Putin's most vocal critics, realized the extent of the charges facing him when he appeared via video link at a procedural hearing in a Moscow court on Wednesday. Officials ruled that Mr. Navalny and his lawyers would have until May 5 to familiarize themselves with 195 new volumes of court files, according to RAPS, the Russian state agency for legal and judicial reporting.

Mr. Navalny, who is 46 years old and already serving a sentence of 11½ years on what he says are trumped-up charges, said the hearing signaled a new criminal case is being prepared against him that could leave him locked up for decades.

"They made absurd accusations that threaten me with 30 years in prison," Mr. Navalny said in a tweet posted by his associates, ridiculing claims that he was responsible for committing terrorism while locked up in the Melekhovo penal colony, some 155 miles northeast of Moscow.

"The story of Navalny's 'terrorism' is simply amazing," his press secretary Kira Yarmysh



Mr. Navalny appeared via video link at a procedural hearing in a Moscow court on Wednesday.

tweeted Wednesday. "A whole new case, a separate trial, the longest term—and all while Alexei was in jail (!)"

Wednesday's court hearing came amid a widening Kremlin campaign to target its critics as Russia's war in Ukraine continues into the spring. Journalists, activists and dissidents also risk longer sentences now than before the war, if they are deemed to have broken the

law, said human-rights activists and analysts who cover the legal system.

Last week, a Russian court convicted Kremlin critic Vladimir Kara-Murza for treason and sentenced him to 25 years. In his final statement to court, Mr. Kara-Murza said he had been imprisoned not for a crime but as retaliation to his opposition to Mr. Putin and the war in Ukraine. Prominent op-

position politician Ilya Yashin was sentenced to 8½ years in prison in December after being charged with spreading false information about Russia's military campaign.

On Wednesday, Yevgeny Roizman, the former popular mayor of Yekaterinburg, east of Moscow, and one of the last vocal critics of the Kremlin still free, went on trial for accusations he had discredited the

Russian military. He couldn't be reached to comment.

Before his arrest at a Moscow airport in 2021, Mr. Navalny had developed a large online following for his exposure of corruption, including investigations into Mr. Putin's personal wealth. Leonid Volkov, Mr. Navalny's chief of staff, said last week that a case was being built against Mr. Navalny where all the work undertaken by his now-banned Anti-Corruption Foundation since 2011 would retroactively be declared as extremist.

Concern is growing about Mr. Navalny's health, which had been damaged by what medical experts in Germany, France and Sweden concluded was a poisoning attempt during a commercial flight in 2020. Some supporters say they believe he is being slowly poisoned in the Melekhovo prison.

This month, Mr. Navalny's lawyer, Vadim Kobzev, wrote on Twitter that his client was sick and that an ambulance had been called to his prison cell. He said Mr. Navalny had lost almost 18 pounds in 15 days and was suffering from stomach pain and seizures.

Authorities at Melekhovo prison and officials at Russia's federal penitentiary service didn't respond to a request to comment on claims that the rules for holding Mr. Navalny are being violated, or that he is being poisoned in prison.

Russian Oil Prices Surge, Putting Sanctions to Test

By JOE WALLACE AND ANDREW DUEHREN

U.S.-led sanctions designed to throttle Moscow's fossil-fuel income face a new challenge: A big jump in the price Russia gets for its oil.

Booming demand in India and China has pushed the price of Urals crude, Russia's main grade of oil, up to about \$55 a barrel from a daily low of \$35 in January, according to commodities-data firm Argus Media. The rally contrasts with a retreat in broader oil markets driven by weakening demand in the U.S. and Europe as economies there slow.

Prices could soon run into the \$60-a-barrel limit the U.S. and allies placed on most Russian crude exports, putting pressure on the West's ability to keep Russian oil on the market while pinching the Kremlin's revenue. Russian crude still trades at a substantial discount to benchmark oil prices, as it has since the Ukraine invasion, but the gap has narrowed.

Some oil traders are starting to question whether they should keep carrying Urals given the risk of getting caught up by sanctions. Others are finding alternative ways to carry Russian oil at higher prices.

David Fyfe, chief economist at Argus, said it is uncertain how

both the U.S. government and oil markets would react to the price of Urals passing \$60. A retreat by Western shippers from the market, spurred by the fear of sanctions, could dent exports and boost global prices, he said.

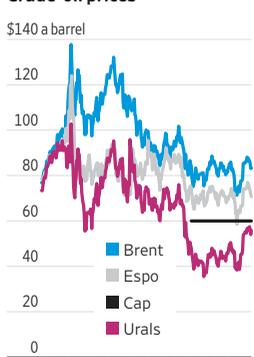
U.S. and European officials say they have stepped up enforcement efforts to ensure compliance with the cap—a move that U.S. officials say isn't related to rising prices. Under the sanctions, the U.S. and allies banned firms in their jurisdictions from facilitating exports unless oil is sold below \$60 a barrel.

Since its launch in December, Western officials say their plan has accomplished its twin goals of stemming the flow of oil money with which Moscow funds the war, while not disrupting global energy markets. Oil-and-gas tax revenue, the biggest driver of Russia's budget, fell 45% in the first quarter compared with last year.

Some traders say the sanctions have pushed millions of barrels of oil each day into a shadow market where money is hard to trace.

As Urals prices approached the cap in recent weeks, traders subject to the sanctions grew nervous about handling cargoes. Traders serve as middlemen between Russian producers and end users, such as oil refineries.

Crude-oil prices



Shipping is a bigger potential pinch point. Though a large amount of Russian oil travels on tankers outside the mainstream shipping industry and the reach of the Western sanctions, Greek companies move huge volumes of Urals.

Five Greek groups have shuttled nearly 15% of seaborne crude and fuel collectively since the sanctions kicked in, according to analysis of shipping data by Global Witness, an anticorruption organization that has campaigned for tougher sanctions on Russia.

The departure of many Western operators from the Russian oil market left a "large gap which was then immediately filled by Greek shippers," said Christopher Lambin, a Global Witness senior investigator.

U.S. officials say they don't see widespread movement toward alternative maritime services as the price of Urals rises. Russian traders and others outside the Western system lack the boats, financing and insurance to move significantly more oil, they said.

Many traders and analysts expect oil to keep flowing nonetheless. At every stage of the war, Moscow has succeeded in finding new buyers, traders, shippers, insurers and financiers. It is on track to export 101 million barrels of its crude by sea this month, according to cargo-tracking firm Kpler, just below January 2022 levels.

In a sign that the market is proving flexible again, one big new shipping company has ditched Western insurance to move oil above the cap. Gatik Ship Management, based in Mumbai, assembled a fleet last year and began to move huge volumes of Russian crude to India. For a time, it was covered against accidents by the American Club of insurers. Gatik recently lost that cover; the American Club's database shows. The

Senior Iranian Cleric Is Assassinated

By BENOIT FAUCON

A top Iranian cleric close to the country's supreme leader was assassinated Wednesday, authorities said, in a rare attack on a senior religious figure at a time of continued unrest.

Ayatollah Abbas Ali Soleimani was fatally shot by a single assailant in a bank in Babolsar, in Iran's northern province of Mazandaran near the Caspian Sea. Authorities arrested a suspect at the scene and were investigating who ordered the killing, state media said.

A motive wasn't disclosed. The assassin was a security guard at the bank who appeared to have acted spontaneously and not as part of a terrorist plan, local Gov. Mahmoud Hosseini told state TV.

Mr. Soleimani was a member of the Assembly of Experts, a deliberative body empowered to appoint Iran's supreme leader. Supreme Leader Ayatollah Ali Khamenei either directly appoints or vets the assembly's membership.

The incident comes after months of nationwide antigovernment rallies following the death in September of Mahsa Amini while she was in police custody in Tehran. Protests recently have erupted over the suspected poisoning of hundreds of schoolgirls in dozens of schools nationwide, which some Iranians blame on the government.

Mr. Soleimani was Mr. Khamenei's former clerical envoy to Zahedan, the capital of Sistan-Baluchistan, a province on Iran's eastern border that has long been a center of unrest. In late September, more than 80 people were killed in weeklong clashes with security forces in the provincial capital. Even after the nationwide protests died down in much of Iran, unrest has continued in Zahedan.

Mr. Soleimani's is the latest in a long line of assassinations inside Iran, though it is the first time in recent memory that a religious figure has been targeted.

Iran accused Israel of killing one of its top nuclear scientists in 2020 and carrying out an attack on its underground nuclear program at Natanz in 2021.

—Aresu Egbali in Terhan contributed to this article.

Pope Allows Women to Vote in Synod Of Bishops

By FRANCIS X. ROCCA

ROME—Pope Francis will allow women to participate in an assembly of bishops as voting members for the first time this year, in his latest move to increase the presence of women in leadership roles in the Catholic Church.

On Wednesday, the Vatican said the next meeting of the Synod of Bishops, set for October at the Vatican, would include at least 40 women voters—members of religious orders, as well as laywomen.

The synod, which is expected to take up controversial issues including women's ordination, contraception and the role of LGBT people in the church, is an advisory body to Pope Francis and can't make binding decisions on its own. Bishops, who are all male, will still make up more than 75% of the assembly following the announced changes.

Yet, the inclusion of women voters is a milestone in the pope's policy of giving women a more prominent role in church leadership.

The pope has ruled out the ordination of women as priests or bishops, and declined to act on the recommendation of bishops at a 2019 synod to allow the ordination of women as deacons, a lower rank of clergy. But he has promised "to create still broader opportunities for a more incisive female presence in the church," including "the possible role of women in decision-making in different areas of the church's life."

WORLD NEWS

South Korea Gains More Nuclear Clout

Seoul tells U.S. it won't develop an arsenal in return for bigger say in North Korea response

By MICHAEL R. GORDON

The U.S. has agreed to give Seoul a greater voice in consultations on a potential American nuclear response to a North Korean attack in return for swearing off developing its own nuclear weapons, President Biden and South Korean President Yoon Suk Yeol said after a summit at the White House.

The accord, dubbed the Washington Declaration, grants South Korea's leadership a long-sought place at the table on the use of U.S. nuclear forces to defend the country, though the U.S. would still retain control over targeting and the execution of nuclear operations. Seoul, in return, would restate its commitment not to develop its own nuclear arsenal.

As a demonstration of America's willingness to use its nuclear deterrent to protect South Korea, the declaration notes that a U.S. nuclear-ballistic-missile submarine will make a high-profile visit to the country. That would be the first time a U.S. strategic submarine has made a port call in South Korea since 1981 when the U.S.S. Robert E. Lee made a similar visit.

"The bottom line here is there's even closer cooperation, closer consultation," Mr. Biden said in a joint press conference with his South Korean counterpart on Wednesday. "We're not going to be stationing nuclear weapons on the peninsula, but we will have visits to ports, visits of nuclear submarines and things like that."

The new accord comes against a background of anxiety in South Korea over the U.S.'s commitment to what foreign-policy experts call extended deterrence—Washington's willingness to use nuclear weapons, if necessary, to defend South Korea despite the risk that North Korea could re-



President Biden touted the nations' coordination after meeting with President Yoon Suk Yeol, second left, at the White House on Wednesday.

calls a "robust communications infrastructure" to facilitate top-level consultations during a nuclear crisis.

The accord will establish a new Nuclear Consultative Group in which senior officials from the two countries would regularly meet to discuss how to reinforce deterrence and the cases in which nuclear weapons might be used.

Those deliberations, the declaration says, are expected to lead to new ways in which the two sides' forces train together in scenarios that could include a South Korean conventional military role in supporting U.S. nuclear operations in a conflict.

U.S. officials say this could include exercises in which South Korean fighters escort U.S. warplanes capable of carrying nuclear weapons. The North Atlantic Treaty Organization has had a similar program, in which fighters from non-nuclear nations escort warplanes designed to carry out nuclear strikes.

The Nuclear Consultative Group wouldn't review specific targets but would focus on the North Korean nuclear threat and how the U.S. and South Korea might respond in a variety of situations.

"It will be the place to talk about what is the exact nature of the nuclear threat from North Korea and how is it changing," national security adviser Jake Sullivan said in an interview. "It is a level up from any kind of target planning or specific operational planning. It is at the level of strategic scenario planning, threats, capabilities, responses."

The declaration says the two sides plan to carry out a simulation that would involve South Korean forces and the U.S. Strategic Command, which oversees the U.S. nuclear arsenal.

Though the declaration calls for steps to spotlight the deployment in and around the Korean Peninsula of U.S. bombers and other strategic systems that are capable of carrying nuclear weapon, it doesn't provide for their continuous presence.

taliat against U.S. territory.

South Korea's concerns have been aggravated by significant advances in North Korea's missile and nuclear arsenal, and the widespread view that diplomacy to denuclearize North Korea appears to be at an end.

Another factor has been the volatility of U.S. politics, which has prompted fears in Seoul that a future president would be less willing to defend South Korea against a North Korean military that has intercontinental-range missiles and a growing stockpile of nuclear arms.

In January, Mr. Yoon stirred concern in Washington by saying his country could develop its own nuclear weapons or ask the U.S. to redeploy on the Korean Peninsula if the threat from North Korea grows. The U.S. deployed tactical nuclear weapons in South Korea in 1958, but removed them following the end of the Cold War with Moscow in 1991. The Biden administration isn't planning to redeploy nuclear weapons

Move Reflects Focus On Nonproliferation

Dissuading South Korea from producing nuclear arms has long been a bedrock principle for the U.S., which fears such a move could encourage the proliferation of nuclear weapons in Japan and in other parts of the world.

South Korea had a nuclear-weapons development program decades ago, but abandoned it under American pressure. In 1975, the country joined the Nu-

clear Nonproliferation Treaty, under which nations without nuclear weapons agree to never develop or acquire them.

Robert Einhorn, a former senior State Department official who is now at the Brookings Institution think tank, said a new deal giving Seoul more say in nuclear discussions is an important step to strengthen deterrence and U.S.-South Korean ties.

"The U.S. and Republic of Korea have had a close, intimate relationship in discussions about conventional deterrence and defense," he said. "But nuclear deterrence has essentially

been off-limits to South Koreans. When South Koreans expressed an interest, they were basically told, 'Don't worry, we've got this.' Now this stovepipe is being broken down."

Other former officials say the declaration reassures South Korea, but it might be insufficient over the long run.

"It is a step in the right direction," said Joel Wit, a former State Department official who is at the Stimson Center think tank. "But many South Korean government and military officials are not going to be satisfied until they have the finger on the button."

ons on the Korean Peninsula.

The Biden administration has said its long-term goal is to reduce the role of nuclear weapons in U.S. strategy. Yet the new accord touts the importance of showcasing American nuclear forces to better deter a North Korean attack, reassure the South Korean

public and, as a result, dissuade Seoul from reconsidering the development of its own nuclear weapons.

"Sustainable peace on the Korean Peninsula does not happen automatically," Mr. Yoon said Wednesday, adding that deterring Pyongyang depended on "the superiority of

overwhelming forces and not a false peace based on the goodwill of the other side."

The new agreement will formally commit the U.S. to "make every effort to consult" with South Korea on the potential use of nuclear weapons. That will involve maintaining what the declaration



The U.S. military launched a missile Wednesday during a live-fire exercise in the Philippines.

Decommissioned Ship Is Sunk In U.S.-Philippines Exercises

By ALASTAIR GALE

SAN ANTONIO, Philippines—The U.S. and Philippine militaries sank a decommissioned naval corvette in the South China Sea with fire from aircraft, a display of force to conclude major annual exercises intended to deepen military cooperation and deter Beijing.

The showcase of mostly American firepower was far from flawless. A Himars rocket launcher that took the first shots at the small warship, located about 12 miles away from the launcher, missed with all six of its rockets.

While the Himars system has proven highly effective in Ukraine against land-based targets, American military officials said the 0-for-6 count demonstrated the difficulty of hitting moving maritime targets. They said a civilian airplane and boat that briefly strayed into the safety exclusion zone near the corvette caused a delay that added to the difficulty of targeting.

The exercise, held at a naval base on the coast of the central Philippines and watched by President Ferdinand Marcos Jr., will give Manila food for thought as it considers purchasing Himars systems as part of an upgrade

of its military.

"What was demonstrated were the capabilities of the Himars, and probably also its limitations," said Col. Michael Logico, the Philippines' spokesman for the two-week training period with the U.S. known as Balikatan, which means "shoulder-to-shoulder" in Tagalog, a language spoken in the Philippines.

The exercises involved more than 17,500 troops this year, the largest size ever, as well as some from Australia and observers from other nations, such as Japan and South Korea. U.S. military officials said the main objective of the exercises was to develop a deeper operational relationship with the Filipino military rather than to test weapons systems like Himars.

Defense relations are set to be on the agenda when Mr. Marcos meets President Biden in Washington for a summit on May 1.

Increased Chinese coast guard harassment of Philippine ships in the South China Sea is fueling closer defense cooperation, as well as concerns about how any attempt by China to seize Taiwan through force could trigger a security crisis in the northern Philippines.

The Balikatan exercises

have traditionally focused on disaster relief, but worries about China are driving a shift toward more preparation for military threats.

The Balikatan exercises follow an agreement in February for the U.S. to use four more military bases in the Philippines, some of which were used during the latest training period as transit points or locations to store equipment. The Wall Street Journal saw U.S. military helicopters and trucks while visiting one of the bases.

In a further sign of deepening military ties, the U.S. Air Force said on Tuesday it would revive joint F-16 jet-fighter training exercises known as Cope Thunder with the Philippines for the first time since 1990.

Not all political leaders in the Philippines welcome closer military relations with the U.S. One of the most vocal opponents is the governor of the northern province of Cagayan, where two of the bases that the U.S. has been newly given access to use are located.

Gov. Manuel Mamba said he was concerned that the presence of the U.S. military would damage prospects for economic cooperation with China and make his province a target in a regional conflict.

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WORLD NEWS

China Expands Scope of Spy Law

China rewrote its law against espionage to tighten state control over a wider swath of data and digital activities, an expansion of its power to neutralize perceived foreign threats that

By Chun Han Wong in Singapore and Dan Strumpf in Hong Kong

raises the risks for businesses operating in the world's second-largest economy.

Foreign executives say the expanded scope and powers of the legislation threaten to turn everyday interactions into national security offenses, and underscore the increasingly hostile environment many foreign businesses believe they face in the country.

The updated law broadens China's definition of national security and gives Chinese leader Xi Jinping a bevy of new tools in his project to harden the country for a potential confrontation with the U.S. and its allies. At the same time, it threatens to undermine efforts by Communist Party leaders to court foreign capital in a bid to revive economic growth.

One concern for foreign executives is that the revised law allows authorities to inspect the facilities and electronic equipment of organizations as well as digital devices such as smartphones and laptops belonging to individuals suspected of spying.

The amended law, approved



The updated law gives Xi Jinping new tools to harden the country.

by senior Chinese lawmakers on Wednesday, also raises concerns that normal business activities, such as gathering intelligence on local markets, rivals and business partners, could be swept up in the broadened definition of espionage.

"The business community necessarily needs information," said Lester Ross, a Beijing-based lawyer and chair of the policy committee at the American Chamber of Commerce in China. "There is therefore a risk that people will be unable on behalf of their companies to gather sufficient information for fear of being branded an espionage agent."

The legislative amendments followed detentions of employees at foreign companies in China, including a Japanese drugmaker and an American

due-diligence firm, as well as revelations that Chinese authorities are holding a Taiwanese publisher of books critical of the Communist Party and a party-newspaper columnist for alleged national security offenses.

"The party remains wary, if not outright suspicious, of foreign actors, and has—at times at least—tended to see contacts with Chinese nationals with their counterparts in business, law, academia, journalism and other fields as inherently suspect," said Thomas Kellogg, the executive director of the Georgetown Center for Asian Law.

"The revisions to the counterespionage law will further enhance the party's authority to crack down on those foreign contacts, and also pose real risks to foreigners them-

selves who are living and working in China," he said.

Chinese officials have been aggressive in recent months in trying to persuade foreign companies that the country is open for business after nearly three years of Covid-19 isolation. Over the past two months, China's minister for commerce has met with a parade of executives from multinationals.

But the drive to open up and court foreign business runs up against Mr. Xi's efforts to combat what Chinese state media describe as an assortment of external threats.

During the past decade, the Chinese leader has made national security an all-encompassing rubric for governing China, driving officials to grow more secretive and to cut off access to data that businesses and analysts had been mining for insights into policy making and the economy.

The latest amendments "reflect an atmosphere of increased suspicion, and added pressure will likely be felt by many in China," said Jeremy Daum, a senior fellow at the Yale Law School's Paul Tsai China Center.

Bain & Co. said Chinese authorities had questioned its staff in the firm's Shanghai office, after the Financial Times reported police visited the site two weeks ago. The U.S. consulting firm didn't say what the visit was about. "We are cooperating as appropriate with the Chinese authorities," it said.

Publisher From Taiwan Faces Beijing's Scrutiny

China said it is investigating a Taiwan-based publisher for suspected national security violations. The publisher, Li Yanhe, disappeared from view after arriving in Shanghai to visit family in March.

Mr. Li, editor in chief of Gusa Publishing, is "under investigation by national security authorities on suspicion of engaging in activities endangering national security," said Zhu Fenglian, spokeswoman for Beijing's Taiwan Affairs Office, at a routine briefing on Wednesday. Ms. Zhu said Mr. Li's rights would be respected.

Mr. Li, who goes by the pen name Fucha, is a Chinese national who has been living in Taiwan since 2009, when he established Gusa Publishing, which has produced Chinese-language books critical of Beijing.

In February, for example, it published a book about Xinjiang, where Western human rights activists and politicians allege authorities use Muslim Uyghurs as forced labor.

The publisher said on its Facebook page that it isn't releasing information about Mr. Li's disappearance out of respect for his family's wishes.

Mr. Li and his family couldn't be reached to comment. The American Institute in Taiwan, the de facto U.S. Embassy, didn't reply to a request to comment.

Taiwan's Mainland Affairs Council said last week that officials were paying attention to the case.

PEN America on Wednesday called for Mr. Li's immediate release.

"His detention is an attack on free expression and another example of the Chinese government's belligerence towards anyone who stands for the free and open exchange of ideas," the New York-based arm of the literary and free-speech organization said.

The Taiwan Foreign Correspondents Club on Monday called on China to "respect the freedom of the press that it enshrines in its constitution, and to release all unjustly imprisoned media workers."

China claims self-governed Taiwan as its sovereign territory.

Mr. Li's detention comes as tensions between Taipei and Beijing have become heated in the wake of Taiwanese President Tsai Ing-wen's visit to the U.S. this month and ahead of presidential elections in Taiwan next year that could reset the island's relations with China.

Confirmation of the national security investigation came a day after China said it would prosecute the leader of a minor political party that advocated for formal Taiwanese independence.

WORLD WATCH

SUDAN

Families Crowd Border to Escape

Sudanese families were massing Wednesday at a border crossing with Egypt and at a main port, desperately trying to escape their country's violence and sometimes waiting for days with little food or shelter, witnesses said.

In the capital, Khartoum, the intensity of fighting eased on the second day of a three-day truce, and the military said it had "initially accepted" a diplomatic initiative to extend the current cease-fire for another three days after it expires Thursday.

The initiative, brokered by the eight-nation East Africa trade bloc known as the Intergovernmental Authority on Development, would also include direct negotiations between the military and the Rapid Support Forces, the paramilitary group it has been battling since April 15.

Taking advantage of relative calm, residents in Khartoum and Omdurman emerged from their homes to seek food and water.

The generals' war for power has pushed the population to a near breaking point. Food has grown more difficult to obtain, electricity is cut off across much of the capital and other cities, and many hospitals have shut down. Large numbers of people have been making the exhausting 15-hour drive across the desert to access points out of the country. —Associated Press



CHERNOBYL ANNIVERSARY: Ukrainian cadets in Kyiv visit a monument to victims of the 1986 nuclear plant disaster. Dozens of people were killed in the immediate aftermath of the accident while the long-term death toll from radiation poisoning is unknown.

BRAZIL

Bolsonaro Testifies About Jan. 8 Riot

Former Brazilian President Jair Bolsonaro gave testimony at the Federal Police headquarters Wednesday about his actions related to the Jan. 8 attacks on

government buildings in the capital, Brasília.

One week after his leftist successor Luiz Inácio Lula da Silva took office, Mr. Bolsonaro's supporters raided and trashed the buildings of the Supreme Court, Congress and the presidential palace. Hundreds of them are expected to stand trial.

Brazil's prosecutor-general, Augusto Aras, said earlier this month that Mr. Bolsonaro "allegedly encouraged the perpetration of crimes" against the rule of law.

Mr. Bolsonaro had never openly conceded defeat. He also repeatedly made unfounded claims that sowed doubt about the reliability of Brazil's elec-

tronic voting system. Many of his die-hard supporters still believe the election was fraudulent, though there is no evidence.

Upon leaving the police building, Mr. Bolsonaro stepped out of his vehicle and offered a smile and thumbs-up to reporters, but referred questions to his lawyers. —Associated Press

COLOMBIA

President Replaces Finance Minister

Colombian President Gustavo Petro, a leftist who has pressed for broadscale social reforms during his eight months in office, replaced his market-friendly finance minister on Wednesday amid the breakup of his congressional coalition.

José Antonio Ocampo, a Columbia University professor who was seen by the markets as a stabilizing force, was replaced as finance minister in a cabinet shuffle that saw seven ministers ousted. The shake-up weakened the long-battered Colombian peso and sent bonds tumbling.

"This is going to generate uncertainty and lots of nervousness in the markets," said Daniel Mejía, an economist at Los Andes University.

The removal of ministers in the 19-member cabinet came as Mr. Petro, a former leftist guerrilla, has seen some of his signature proposals stall in Congress or run into political opposition.

A ruling coalition that had included centrist and conservative parties had crumbled in recent weeks as the president pressed for broad changes in a healthcare system that polls showed most Colombians favor.

Ricardo Bonilla, who headed the finance department for Bogotá when Mr. Petro was mayor, is the new finance minister. —Juan Forero

Bolivia Makes a Tiny EV

Continued from Page One

go 60 miles before needing a recharge, which can take six to eight hours.

"It was love at first sight," says Daniel Derenne, a 62-year-old retiree in Cochabamba who bought a Quantum shortly after it was released in September 2019.

Today, he has driven 6,000 miles in his tiny ride. He attests that it can squeeze in three people, "but they can't be very fat."

Mr. Derenne used to have a sticker on the rear window noting the vehicle is electric and doesn't pollute. He hoped that would encourage others to transition to EVs, a rarity in Bolivia.

Most people applauded his message, he says. But some drivers thought he was accusing them of being polluters. As they zoomed ahead of his tortoise-like ride, Mr. Derenne recalls a few flipping him the middle finger. And bus drivers referred to his car as *El Estorbito*, or The Little Nuisance.

"They don't respect you at all," says Mr. Derenne.

Quantum's founders believe the vehicle—the first ever made in Bolivia—is the future of the automotive industry in Latin America, home to 670 million people. In the developing world's traffic-jammed streets, miniature cars make more sense, says Carlos Soruco, one of Quantum's founders. And it's far cheaper to run than conventional automobiles. Quantum owners say they spend about \$7 a month to charge their cars.

The Bolivian-made EV can be plugged into any outlet, eliminating the need to invest in costly charging stations. Finding parking is a cinch. Its \$7,500 price tag makes it much more affordable than the flashier EVs in the U.S. and Europe.

"We're convinced that the development of electric vehicles in Latin America isn't going to be with Teslas or Volkswagens," says Mr. Soruco.

So far, Quantum has sold 370 cars.

Bolivians have long dreamed of having their own automotive industry, believing it would allow one of the Western Hemisphere's poorest nations to reduce its economic dependence on exporting raw materials, from silver to natural gas. Politicians promise that their landlocked nation would one day use its vast lithium deposits—the world's biggest—to power the world's



Ximena Pérez, who bought a Quantum during the pandemic, says her tiny dog is 'made for the car.'

transition to greener energy.

Angie Sciaraffia, a med student, was delighted to buy a Bolivian-made car, with its rearview mirror so small it can fit in the palm of your hand. She settled on a diamond blue Quantum with tinted windows and a sunroof.

"Having a car that is Bolivian is spectacular," said Ms. Sciaraffia, describing it as easy to drive. "You just accelerate and brake."

In Bolivia, Quantum has a small but loyal following among car owners like Ms.

Sciaraffia, who honks and waves at other Quantum drivers when they see each other on Cochabamba's streets.

Ximena Pérez adores hers. She bought it during the pandemic, concerned about taking crowded buses. Ms. Pérez says she's never felt like the car lacked space, except once when she went camping. She struggled to pack her tent, a spare tire and her dog into the back of the Quantum. Fortunately, her dog is a chihuahua.

"He's made for the car," she said.

Initially, the company couldn't register its cars in Bolivia because local laws required all vehicles to have an import document, standard paperwork in a country where no one had ever made a car before. Insurance companies were wary of providing coverage. Banks were unsure how to structure car loans.

Quantum closed shop for a few weeks just after opening in 2019 as violent political protests paralyzed Bolivia. Then the pandemic hit, upending global supply chains

and making it more expensive to import Chinese parts. Today, a dollar shortage in Bolivia has made it difficult to pay for imports.

Despite Bolivia's massive lithium resources, the country barely produces any of its own because of tight state control that has hindered private investments. As a result, Quantum's batteries use lithium from China.

José Carlos Márquez, an engineer who is Quantum's other founder, came up with the idea for the EV in 2015 while building an electric wheelbarrow for miners.

Edgar Roman bought his Quantum in 2020. He uses it for his job, which requires him to visit government offices to fill out paperwork to import construction equipment.

The Quantum, Mr. Roman said, tends to start with a jerk rather than gradually accelerating and offers a bumpier ride than his other car, a Nissan. The Bolivian car doesn't have heating, making it chilly in the winter. Mr. Roman says it's also awkward trying to speak with his wife while she's sitting behind him.

Once, the battery nearly ran out of juice. He made it home by driving about the speed of a jogger. Other vehicles honked for him to move aside. His mom sat in the back seat. "She was saying, 'You can do it Quantum, you can do it.'"



Dear Readers,

We continue to be shocked and outraged over the wrongful arrest of Wall Street Journal reporter Evan Gershkovich, who is imprisoned by the Russian government for no other reason than newsgathering.

As editors and publishers of some of America's largest news organizations, we are united in calling for his immediate release. Reporting is not a crime.

Over the past month, we have watched our industry not only rally around Evan but stand up for journalism and the importance of a free press. We also encourage support from the U.S. government, including President Biden and the White House.

In a world growing increasingly complex, the need for factual and reliable information has never been greater. At the same time, it's no secret that reporting is under attack. Evan's case is the latest in a disturbing trend where journalists are harassed, arrested or worse for reporting the news.

Evan is a distinguished journalist whose coverage has provided an important window into one of the world's most isolated countries; his detention is a loss not just for our individual publications but for the people of Russia and society at large.

The unjust arrest of any reporter, anywhere in the world, is simply unacceptable.

We stand united in demanding Evan's release and we won't rest until he is safely brought back home.

Sincerely,

Emma Tucker, Editor in Chief, The Wall Street Journal
Almar Latour, Publisher, The Wall Street Journal, and CEO, Dow Jones

Sally Buzbee, Executive Editor, The Washington Post
Frederick J. Ryan, Jr., Publisher and CEO, The Washington Post

Joseph Kahn, Executive Editor, The New York Times
A.G. Sulzberger, Publisher and Chairman, The New York Times

#IStandWithEvan

The Washington Post

THE WALL STREET JOURNAL.

The New York Times

FROM PAGE ONE

Military's Explosives Problem

Continued from Page One
standstill.

Today that's emerging as a gnawing problem for the U.S., whether in supplying weapons and ammunition to Ukraine or in restocking reserves to prepare for a potential confrontation with China in the new era of great-power competition, according to U.S. military officials, defense experts and congressional staffers.

After months of supplying Ukraine with Stingers, howitzers, anti-armor systems and artillery ammunition, stocks are low in both the U.S. and its NATO allies, especially in 155mm howitzer shells, an ammunition that has been crucial to pushing back Russian forces.

"Can you imagine what would happen to these supply chains if the U.S. were in an actual state of active war, or NATO was?" said Jeff Rhoads, executive director of the Purdue Institute for National Security, a defense-research institute at Purdue University. "They could be in trouble very quickly."

Black powder

The "incident," as the Minden explosion has become known, is a pointed example of the risks facing America's military. The blast that wrecked a World War II era building in a remote compound 30 miles from Shreveport has extinguished all production of black powder in North America.

The accident was part of what Labor Department records show is the mill's history of explosions and fatalities under various owners in recent decades. The mill traces its origins to the 19th-century DuPont chemicals empire, and at the time of the blast was owned by Hodgdon Powder Co.

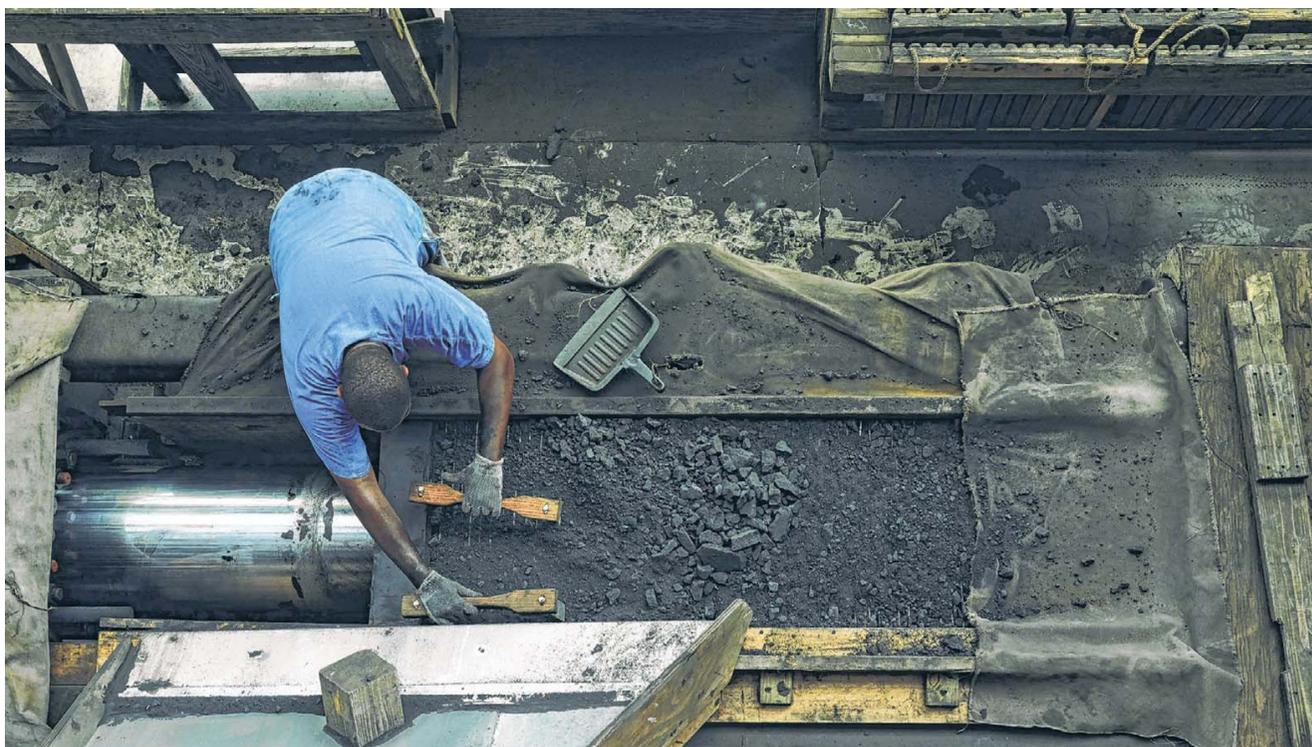
For a millennium, black powder was a crucial material for both military and commercial uses. Today, it is a specialty commodity with few commercial applications—mostly for rocket hobbyists—but it's still used in more than 300 munitions, from cruise missiles, to bullets for M16 rifles, to the vital 155mm shells.

In each case, a small amount of black powder is used to detonate a more powerful explosive packed in the same bullet or missile. A 155mm shell for a howitzer, for example, will use half an ounce of black powder, lodged next to 26 pounds of a more powerful explosive.

Sales volume is limited and that means profits can be too thin to support more than a single production facility. This type of vulnerability is so common, the Pentagon describes it as the "single source" problem. Only one foundry in the U.S. makes the titanium castings used in howitzers, and only one company makes the rocket motor used in the Javelin anti-tank weapon widely used in Ukraine.

Part of the problem is that the Pentagon can be a fickle customer. Orders can surge or plummet depending on inventory levels, the state of U.S. military engagements or budget priorities. This posed a challenge for the operators of the black powder mill, who also faced costly regulations.

Hodgdon, which bought the Minden powder mill in 2009, said military purchases at that time represented significant sales. But over time, they "slowed in both frequency and volume," said Aaron Oelger, spokesman for Hodgdon. He



Nonexplosive testing materials being loaded into a press at the black powder factory in Minden, La., above, in February; conveyor belts are used to move materials into a separate room to be packed by remotely operated equipment, below left; mixing nonexplosive materials, below right.



said no one with the company now was there at the time of the explosion.

Hodgdon decided to get out of the business after the explosion, and sold the mill last year to one of its shortlist of commercial customers, a model-rocket maker in Penrose, Colo., named Estes Industries. The Pentagon helped the transition with a \$3.5 million investment in mill upgrades under the Defense Production Act, which provides funding for national defense, part of a larger program designed to alleviate the problem of having critical resources produced in far-flung, sometimes unreliable places.

After refurbishing the mill, Estes Energetics, spun off from Estes Industries, is scheduled to relaunch production and restart supplies to military contractors by this summer. Estes Industries also supplies students and hobbyists with model rockets, kits and accessories, and the small quantities of black powder used in old-fashioned weapons for re-enactors and hunters.

In the meantime, U.S. military contractors who use black powder have been drawing on stockpiles, according to people familiar with the matter and U.S. officials. Other producers of black powder exist in Germany, Poland, Switzerland, Brazil and China.

Chokepoints are one of a number of weaknesses in the U.S. military's supply chains. Others include a lack of skilled workers in casting and forging, shortages of infrastructure for battery technology and periodic shortages of advanced microchips.

Some domestic suppliers have quit unprofitable businesses altogether, leaving it to both allies and adversaries to supply commodities such as the rare earth minerals used in state-of-the-art technology. The Pentagon has invested more than \$100 million in the mining and processing of such minerals in the U.S. after American companies ceded production to China.

The result is that the military is "increasingly reliant on a smaller number of contractors for these critical capabilities," said Halimah Najieb-Locke, deputy assistant secretary of defense in charge of the industrial base, at a recent seminar. "That impacts everybody's ability to ramp production."

'Last Supper'

The roots of the current crisis can be traced back three decades, to a 1993 dinner at the Pentagon often referred to as the "last supper," when Secretary of Defense Les Aspin invited the CEOs of the top 15 defense companies and warned that the Pentagon couldn't sustain them all. They would need to consolidate.

The number of major arms suppliers for the Pentagon went from dozens in the 1990s, down to just five, known as primes, who typically bid for major weapons programs today. A similar contraction took place among lower-tier suppliers.

Overall, the defense industrial base shrank to 55,000 vendors in 2021, down from 69,000 in 2016.

Despite consolidation, the

networks of companies remain large. The average American aerospace company relies on hundreds of first-tier subcontractors, according to Defense Department statistics, and thousands in the second and third tiers below that.

That scope presents its own problems. The network is so vast, the military has limited visibility, according to a Pentagon report, and "does not track these vulnerabilities as they impact weapons programs." A failure down the supply chain can go unnoticed for months by prime contractors such as Boeing Co. or Lockheed Martin Corp., let alone the Pentagon.

The Minden mill, as a fifth-tier supplier, was deep down the defense supply chain. Given black powder's importance, the Army in this instance noticed right away, according to people familiar with the matter. It still took months for the new owner to take over, and by the time Estes began refurbishing the mill, yellow wildflowers had sprouted in the factory yard.

Black powder is made essentially the same way it was 200 years ago. Some of that rusticity, using huge 6-ton metal and wooden wheels and grinders and sifters, is by design. The parts minimize the sparks that caused the accident in 2021 in the mill, where the fine powder is compressed into cakes and crushed into various sizes, and shut down the plant.

There are few computers near production areas at the Minden facility because electronics pose sparking dangers. Workers wear special shoes and floors are covered in paint

that prevents the accumulation of static electricity. Cotton clothes also help mitigate the risk of sparks. Employees operate machinery much like a dentist takes an X-ray, standing outside the production

ministration to strengthen the industrial base. It is working with suppliers to address similar weaknesses in munitions, forging and casting, batteries and microelectronics.

Last year, the Defense Department identified 27 critical chemicals that have no U.S. production and are sourced from places, including Russia and China, considered adversaries of the U.S.

The Pentagon expects to spend more than \$207 million to bring production of materials back to the U.S. as soon as possible.

A handful of critical materials used by the U.S. are only produced inside war-torn Ukraine, said Anthony Di Stasio, a senior Pentagon official in charge of prioritizing and investing in defense production.

Stimulating the marketplace to bring production to the U.S. is doable, he said. "I'd be really surprised if we couldn't get this done within the next three years," Mr. Di Stasio said, of the overall effort.

In February, Estes company officials touring the facility pointed to upgrades to the mill. It now has a new, state-of-the-art fire suppression system, a shiny network of metal pipes and water guns aimed at the points of production vulnerable to the sparks that caused the 2021 accident.

The previous month Estes had restarted production of an inert black powder substitute as a safety test, before it resumes production of the real thing. The launch has been delayed a number of times, once recently when a water main broke in the middle of the factory grounds.

"Whenever you turn on old machinery that has stood for a while, [there] tends to be something that breaks," said Karl Kulling, chief operating officer of Estes Energetics. "So we've gone through basically each machine and fixed up things here, there and everywhere."

The Pentagon has identified 27 critical chemicals with no U.S. production.

of a gun or cannon barrel—because it was more powerful, produced less smoke and left less residue. It was also somewhat safer to produce.

After World War II, the black powder business declined, and the main customers used black powder in fireworks, model rockets or muzzleloading historic guns. The DuPont conglomerate sold its last remaining black powder mill in Pennsylvania in 1971.

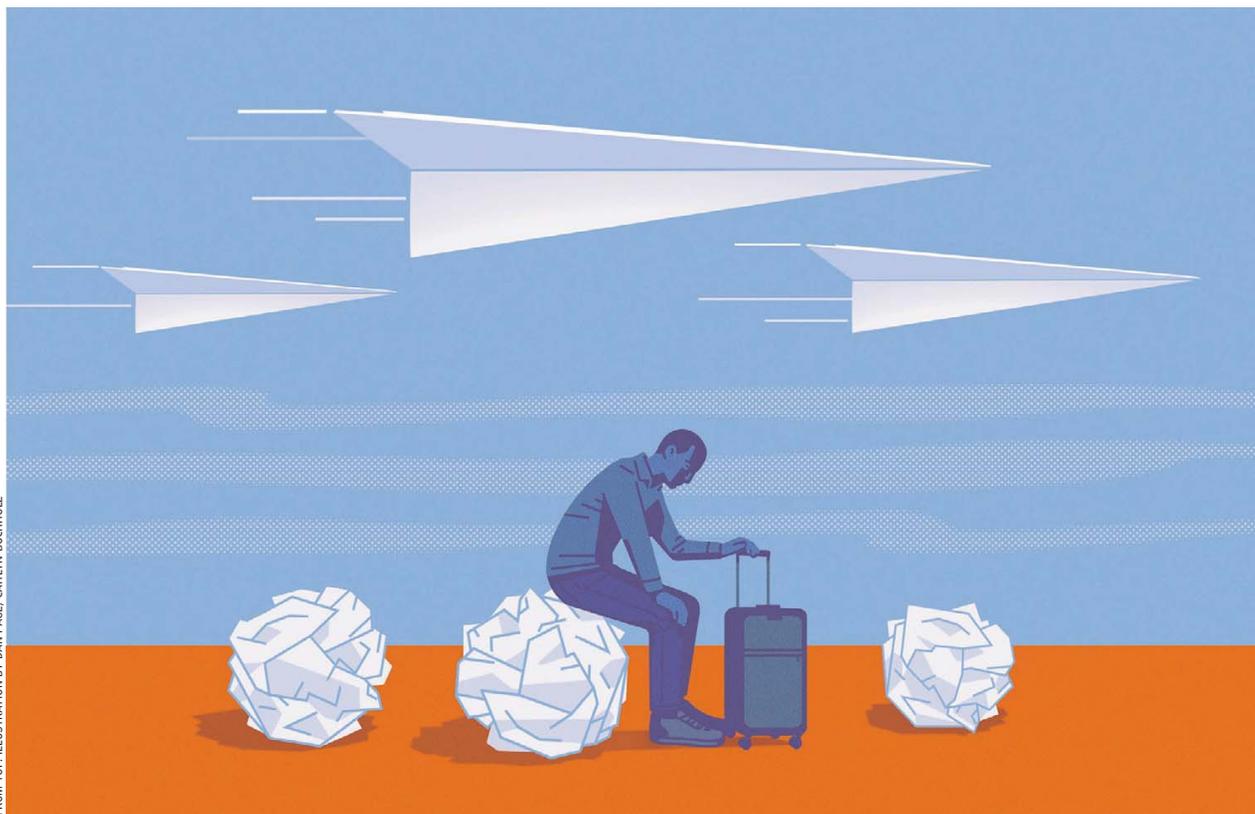
After an explosion killed two employees, its new owners moved it to Minden in 1997, in part because Louisiana's humid weather could reduce sparks. "Humidity is a powder man's best friend," Anita Vincenti, a Minden mill worker who moved with the plant from Pennsylvania, said this fall.

The Pentagon's \$3.5 million investment in mill upgrades after the recent shutdown is part of an effort by the Biden ad-



The Minden mill, above left, is being rebuilt after the 2021 explosion; U.S. Army soldiers working on a M777 howitzer in a joint military drill between South Korea and the U.S. in March.





FROM TOP: ILLUSTRATION BY DAN PAGE; CAITLYN BUCHHOLZ

Journey of a Thousand Miles Starts With Single Misstep

Botched reservations or failed passport renewals happen to even the savviest travelers



CARRY ON
DAWN GILBERTSON

Some travelers splurge on a Louis Vuitton handbag during a Paris vacation. My souvenir was decidedly less sexy: a \$400 penalty for boneheadedness.

I shelled out that money at Paris Orly Airport after I made an embarrassing but common mistake. I booked the wrong date for a nonrefundable flight to Portugal and didn't find out until I tried to check in with TAP Air Portugal at the airport.

TAP had no other available seats that early April day. The next day was iffy and would still require me to pay the fare difference. So I bought a \$400 one-way flight on Iberia Airlines and ate the other ticket, which cost \$150. It was an expensive lesson on being careful when you book travel. I'd bought the flight on my phone in a rush and the date I put in was a week later than intended.

Travel is expensive enough these days without adding in the cost of your mistakes. But they happen all the time, even to the

platinum travelers among us.

Reddit and other social-media sites are loaded with confessions from people who booked the wrong date, wrong direction or even wrong city with the right name. (Was your destination Rochester, N.Y., or Rochester, Minn.?) A member of Girls Love Travel, a Facebook group with nearly 1.4 million members, posed a question about travel mistakes recently. It drew more than 1,200 comments. Unforced errors included packing a big new bottle of perfume in a carry-on bag and missing a flight after the announced delay evaporated.

Major airlines have taken the sting out of some mistakes with the elimination of ticket-change fees, and Transportation Department rules usually require airlines to offer refunds within 24 hours of booking. Those aren't much help if you realize your mistake late. Hotels and car-rental companies generally have more flexible change policies unless it's a prepaid reservation, which often offers the cheapest rates.

One car, two airports

Kansas special-education teacher Diane Blake isn't her family's travel planner: Her husband handles that, she says. But he bowed out of a trip to Disney World with their daugh-

A passport snafu nearly upended their honeymoon in Jamaica for Caitlyn and Drew Buchholz.

ters a few years ago, so Mrs. Blake booked the Allegiant flight to Orlando, Fla., and reserved a rental car.

She didn't realize until she landed at Orlando Sanford International Airport that her car awaited them at Orlando International Airport, 30 miles away. The budget car-rental company she booked didn't operate at the smaller airport. She says a woman at the rental counter had "zero empathy left," because passengers routinely make the same mistake.

She and her daughters Ubered between the airports to pick up and return the car. "I was trying to save money but my mistake cost us hours and \$120," she says.

Scott Keyes, founder of the travel site Going, formerly Scott's Cheap Flights, says travelers have also been known to book the wrong airport for flights, some-



times with comical results. One of his favorites: booking a ticket to Sydney, Nova Scotia, instead of Sydney, Australia.

International missteps

Passport problems trip up plenty of travelers. They realize too late that their passport expired or will expire within the next six months,

which might preclude entry to some countries.

Caitlyn Buchholz, a radiologic technologist in St. Louis, and her husband nearly missed their honeymoon in Jamaica due to a whopper of a passport issue.

Two days after their December 2020 wedding, they flew from Orlando to Jamaica. Mrs. Buchholz grabbed their passports from a safe before the trip and uploaded the information to her reservation, along with their Covid test results, then a major travel requirement. They scanned the passports at the airport and boarded without issue.

The trouble began seconds after she texted her family a photo of the sparkling Caribbean Sea she'd snapped during landing. A security official entered the plane looking for her husband. "You could tell this guy deals with trouble," she says.

The official quickly escorted them off the plane and into a room. They figured out the problem: Her husband had reported the passport lost a few years earlier and later found it, but stored that in the safe along with his replacement passport. It hadn't expired, so it didn't raise any alarm bells for them.

The couple was sent back to Orlando immediately. His mother overnights the correct passport to their hotel. They stressed over whether it would arrive in time the next morning, but it did. They returned to Jamaica for what she calls the vacation of a lifetime.

Her advice: "If you ever claim your passport lost or stolen, or you've got a new one for whatever reason, you burn the existing one."

Anne Fuldbly-Olsen, founder of Lincoln, Neb.-based tour company Women of the Midwest, routinely counsels clients to toss their old passports. So she was mortified when she pulled out an expired

passport at the check-in counter at the Athens airport in late 2019.

"I grabbed the one with the [punched] holes in it," she says. "I don't know how. It was just a nightmare."

She woke up her husband and asked him to meet her driver to hand off the correct one. He delivered it to the airport about 50 minutes before her flight to the U.S. She was flying business class; she doesn't think she would have made the flight if she'd been in economy.

Mr. Keyes says travel fails can occasionally work in your favor. On a trip to Barcelona in 2016, he and his wife were distraught when the hotel they thought they'd booked near Las Ramblas, a popular boulevard, had no record of their reservation.

They had mistakenly booked a different location in the NH Hotel chain, a couple miles away in the Poblenou district, a lovely neighborhood that was less touristy.

"Sometimes, the unintended parts of travel end up being more memorable," he says.

Reality TV's Newest Character: Ozempic

BY SARA ASHLEY O'BRIEN

"YOU'RE LOOKING THIN," Andy Cohen told "Real Housewives of New Jersey" star Dolores Catania on a recent episode of his late-night Bravo talk show.

"Ozempic?" he asked.

Mr. Cohen was talking about Ozempic, a Type 2 diabetes drug that is part of a group of injections changing weight loss as we know it. Ms. Catania said that yes, she was taking the drug, but clarified in a segment of the show posted online that it was actually Mounjaro, a competitor. "That's the amped-up version," said Marysol Patton, a "Real Housewives of Miami" cast member who was seated beside Ms. Catania. "That's the fast-forward to Skinnyville."

Though these drugs are relatively new, reality TV stars speak about them with familiarity and frequency, as if they were unofficial characters in Bravo's "Real Housewives" universe. Mr. Cohen, the franchise's executive producer, first helped establish the connection in September, when he tweeted to his 2.4 million followers, "Everyone is suddenly showing up 25 pounds lighter. What happens when they stop taking #Ozempic ??????" In the "Watch What Happens Live With Andy Cohen" segment with Ms. Catania, Mr. Cohen stoked the flames again:

"What Housewife isn't on Ozempic?" he said. "Not one," Ms. Catania replied. "Half your cast," he said.

Every week, another star from the show's orbit speaks out about GLP-1s—a class of drugs that includes Novo Nordisk's Ozempic and Wegovy, as well as Eli Lilly's Mounjaro. Mentions need no introductions from producers, podcasters or posters in online forums, where gossip has become so rampant that one Reddit forum banned speculative discussion about the drugs.

While the Bravo juggernaut has been known for candid discussions about sensitive topics like plastic surgery and eating disorders, the spotlight on these injections is amplifying a debate about whether they are being prescribed too liberally. (Wegovy is approved by the FDA to treat obesity. Ozempic and Mounjaro are not, though providers may prescribe them off-label for weight loss.)

Bravo stars who speak openly about using the drugs say they're doing what they were hired to do: Be real. While there has been speculation about widespread Hollywood use, reality TV stars are among the rare celebrities who have been upfront about GLP-1s.

"I think Housewives on the whole are very honest. So, everybody weaponizes everything they do against them," said Margaret Josephs, a Real Housewife of New Jersey, who has



Andy Cohen and reality star Dolores Catania discuss Ozempic on his late-night Bravo show.

New 'Real Housewives' drama is about who is and isn't taking drug used for weight loss.

been taking compounded semaglutide—the active ingredient in Ozempic and Wegovy—since last spring, in addition to peptides. "It wasn't about, 'Oh I want to be thin' I really want to feel good and looking great was a bonus." Still, her weight loss has drawn tabloid coverage. "I really have no shame in it."

Other Housewives have denied

use. "Apparently a lot of people think I'm taking Ozempic," Kyle Richards of "The Real Housewives of Beverly Hills" said on a January podcast. "To clarify, I've never taken Ozempic, never tried Ozempic, and I'm not taking the other one that starts with an 'M.'" She said she'd had a breast reduction, curbed sugar and carbs, cut out alcohol and worked out.

Ms. Catania, who was frank about using Mounjaro on "Watch What Happens Live," walked back her words in a subsequent interview, as did her doctor, Rocio Salas-Whalen.

"There's a reason behind why the patient is on the medication," said Dr. Salas-Whalen, an endocrinologist and obesity physician. "Without going into details about her health,

the way that she presented it to the public, that is different."

Mr. Cohen's exchange with Ms. Catania received some backlash, which he acknowledged on his Sirius XM radio show. He didn't want to glorify thinness, he said, but he felt it was important to stay true to the show's candor around bodies.

"I'm trying to deliver the goods, though, for my audience who are watching," said Mr. Cohen.

Dr. Reshmi Srinath, medical director of Mount Sinai Hospital's weight and metabolism management program, said that popular culture can help increase awareness about health treatments. But a quick mention in a TV show can also have an adverse effect, leading viewers to believe a pharmaceutical approved to treat specific diseases is a "magic drug."

Jackie Goldschneider of "The Real Housewives of New Jersey" said she learned about Ozempic in the fall, after the show's season had stopped filming. "All of a sudden I feel like out of nowhere, I started seeing it and hearing about it everywhere."

She is in recovery from anorexia and said it was jarring to see her peers eating such reduced portions. Ms. Goldschneider knows the focus on reality stars comes with the territory of being public figures. She sees them as a microcosm of a conversation that is taking place around the world, as people looking to lose weight clamor for Ozempic, Wegovy and Mounjaro prescriptions.

"It's so much bigger than the 'Housewives' franchise," she said.

PERSONAL JOURNAL.

By ANNE MARIE CHAKER

Lisa Donovan was juggling pings from multiple Slack channels and email windows when she inadvertently sent a sensitive company document to the wrong person.

The part-time accountant for a Virginia-based academic coaching firm toggles between 30 instant-messaging channels, four client-email accounts and at least a dozen phone or video calls a day, she says.

"It's, like, 'Are we on Zoom? Are we on Teams? Did I respond to that? Did I say it right?'" says Ms. Donovan, who works from Richmond, Texas.

There are so many ways to communicate at work that our communication is breaking down. Bosses say missed messages and crossed signals waste time and trigger mistakes, while research suggests that so much virtual communication makes it easier to snipe at or ignore co-workers. Then there's the stress of having to stay on top of so many different channels all the time.

Microsoft Corp.'s Teams use has surged to more than 280 million monthly active users. Zoom Video Communications Inc.'s business customers have nearly tripled to more than 210,000 since the start of the pandemic, and Salesforce Inc.'s Slack is also growing. In many cases, the clients of each overlap and use the tools on top of emails, texts and in-house messaging forums.

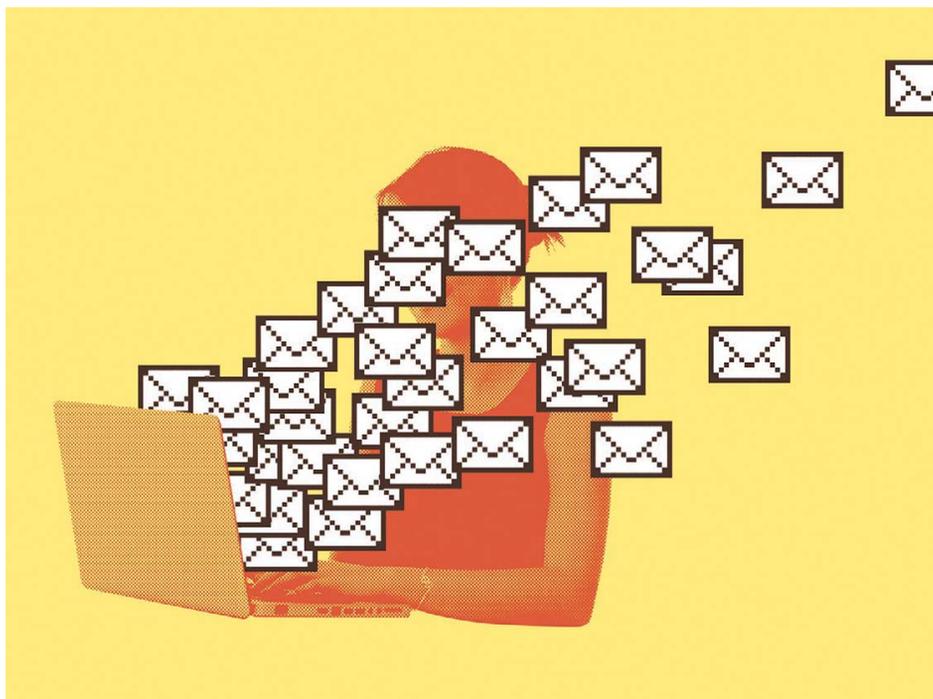
All of it is enough to make workers long for the days of complaining about email-inbox overload. "It's overwhelming," says Wendy Weinberger, Ms. Donovan's boss and head of the firm. The company's IT department was able to successfully recall the sensitive email.

In a 2022 Harris Poll survey of more than 1,200 workers and executives, bosses estimated that their teams lost an average 747 hours—nearly an entire day—to poor communications a week. Based on an average salary of \$66,967, the lost time translates to a cost of \$12,506 per employee a year, according to the report conducted on behalf of Grammarly, a proofreading software company.

A new study from executive-search firm Korn Ferry found that communication misfires have helped to make some work rela-

Communication Tools Overwhelm Workplace

New technology often breeds mistakes and misunderstandings



tionships less pleasant and collegial. Among 357 professionals surveyed in recent weeks, nearly half said that remote work made it easier for colleagues to get away with rude behavior such as interrupting on calls and not returning emails.

Remote work has accentuated colleagues' different communication habits, and their potential to clash, some employees say.

"These tools that are meant to make communication easier have a dark side," says Michele Simon, a Los Angeles-based lawyer specializing in workplace trauma. A new Pepperdine University study on workplace toxicity that surveyed 800 office workers found that 35% cited communication problems as the top barrier to getting ahead in

'These tools that are meant to make communication easier have a dark side,'

today's workplace—ahead of office politics (29%), small budgets (26%) or ineffective plans (20%).

Michelle Sooknanan says that at her previous job as a sales manager for a Florida food manufacturer, her boss would often call her impromptu via video as she worked from her home office in Portsmouth, N.H.

She says she found the un-

scheduled calls to her desktop computer stressful and asked that, outside of scheduled calls with the team, she be contacted only by email or instant message. Her manager emailed a couple of days later that her request couldn't be accommodated, and that video would sometimes be necessary.

Ms. Sooknanan says the tension contributed to her eventual departure. The company didn't respond to requests for comment.

Multiple modes of communication get more complex as the number of people on a conversation thread grows, says Jessica Carlson, a former director of supply-chain operations at Nestlé SA who left the company in March. Wrestling with post-Covid supply-chain chal-

lenges often took place over multiple time zones and forums.

"You could have an email chain, a text thread, a videoconference call and an in-person one-on-one about the same topic all within 24 hours," says Ms. Carlson, who has since founded consulting firm headStrat Solutions.

Many companies have largely left it to teams and co-workers to sort out how they communicate, which can add to the confusion. For workers feeling overwhelmed, making a clear choice ahead of time can help, says Sally Susman, chief corporate affairs officer at Pfizer Inc. and author of a recent book on improving workplace communications.

She suggests asking teammates or other colleagues what their communication preferences are, while also being unafraid to state your own.

In the absence of in-person social cues, she adds, the voice becomes more important. Use it to transmit collegiality and other positive qualities that would ordinarily be picked up in person. Even in email or text messages, small touches like "Hi there" can exude warmth in formats that ordinarily feel cold and transactional.

Some companies are trying to come up with new ways for workers to get messages across. Archer Daniels Midland Co. has corralled its modes of communication by linking instant messaging, email, video and social-media style updates into one central hub.

Its "air-traffic control," says Brett Lutz, vice president of global communications at Archer Daniels Midland. He says the forum, powered by workplace communications software company Firstup, lets workers see stories, images and other updates.

Shopify Inc., the e-commerce and retail technology company, recently instructed staff to shift to Meta Platforms Inc.'s Workplace, which combines instant messaging, videoconferencing and other communications tools. "Email hasn't evolved in the last 30 years. And it still sucks," Shopify Chief Operating Officer Kaz Nejatian wrote in a January memo to staff.

To get there, though, employees would have to check their email for an invitation to join. "Didn't get that email? Check Okta or ping #help-chaos," he continued, referring to two more ways employees could inquire about an invite.

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Find Room to Haggle In Home-Buying Costs

By VERONICA DAGHER

Home buyers might have better luck saving thousands of dollars by focusing their haggling skills on items other than the home's purchase price.

The price of the home is a major detail, especially as mortgage rates move up. But given that the housing market remains competitive in several parts of the country, home buyers hoping to negotiate down a seller's asking price might risk losing their bid.

Financial advisers and brokers say that in certain markets, buyers should focus more effort on negotiating other costs. There is thousands of dollars in savings to be found bargaining with moving companies, mortgage lenders and utility companies even as inflation remains elevated.

Kalli and Francesco Vetrano saved about \$20 to \$30 a month on heating-oil costs by not choosing the first offer and negotiating among several vendors.

"It really goes to show that taking the time to make a few phone calls and ask questions can save you in the long run," said Ms. Vetrano, who bought a home last year in Rockville Centre, N.Y.

Mortgage rate

Big potential savings, say advisers, often come from comparison shopping and negotiating your mortgage rate.

Borrowers who applied with two different lenders reduced their mortgage rate by an average of 0.10 percentage point, according to research from Freddie Mac that examined purchases between 2010 and 2021. During the first 11 months of 2022, when the average mortgage rate increased at its fastest pace in 40 years and surpassed 7%, the average reduction in rate doubled to 0.20 percentage point.

Take a \$400,000 home price where the buyer puts 20% down and is looking at

current mortgage rates ranging from 6% to about 7%. Over 30 years, the difference between 6% and 7% could add up to roughly \$75,000 savings in interest, said Ted Rossman, a consumer-spending analyst at Bankrate.

Ask to skip fees

With mortgage volume down sharply from a year ago, many lenders want to be competitive to win business and so they might be willing



Mortgage rates and fees, moving expenses and even maintenances costs can all be negotiated.

to waive certain fees, said Shane Sideris, a financial adviser in Santa Barbara, Calif.

Fees you can negotiate with your lender include origination fees, underwriting and loan-application fees, said Aniva Hinduja, general manager of home and mortgage at Credit Karma.

Reduce moving costs

A rise in mortgage rates in the past year has limited home sales and put a dent on Americans' moving plans.

This might make some moving companies more willing to negotiate than they were during the height of the pandemic-fueled housing frenzy, said Emily Irwin, senior director of advice at Wells Fargo & Co.

The average cost of a local move is \$1,250, according to Realtor.com. For long distance, it will cost a bit under

\$5,000 (based on 1,000 miles for a two- to three-bedroom home).

Get quotes from at least three moving companies, said Ms. Irwin.

Movers typically charge a flat fee or an hourly rate. If it is an hourly rate, be sure to ask for the estimated number of hours and request that the moving contract include a cap so you know the possible maximum bill, she said.

Negotiate not only on price, but also on benefits, such as packing and unpacking your items, furniture assembly or replacement value insurance coverage if any of your belongings are damaged or lost during transit. Ask if



Mortgage rates and fees, moving expenses and even maintenances costs can all be negotiated.

you can have a reduced price if you are willing to move on a weekday, she said.

Cut your upkeep costs

The costs to maintain your home add up quickly. Look for ways to trim those expenses, said Cheryl Costa, a financial planner in Framingham, Mass. In exchange for a roughly 10% discount, Ms. Costa put up her landscaper's sign on her lawn advertising their services.

She has also banded together with neighbors to land a group rate on services such as driveway paving and home painting.

Mr. Rossman at Bankrate was able to save \$1,000 on a hot tub last year by agreeing to provide a review that the manufacturer could use for marketing purposes.

"You don't get a discount if you don't ask," he said.

15/STOCK

ARTS IN REVIEW



Rembrandt House Museum's exterior, left, and interior, below left; the artist's 'Titus at His Desk' (1655), above

ART REVIEW

Rembrandt's House Revitalized

The Dutch master's newly reopened studio-home is an elegant, transporting museum

BY DIANE COLE

Johannes Vermeer's name is on nearly everyone's lips these days, but what about his great contemporary, Rembrandt van Rijn? He's in the news, too, owing to the newly reopened and revamped Rembrandt House Museum, where he lived and worked for close to 20 years.

The stately three-story red-brick building was erected in 1606, the year Rembrandt was born. By the time he bought the upscale property 33 years later, he had become one of the most successful painters, art teachers and art dealers in the country. Here, over the next 19 years, his life unfolded, charted by the creation of masterpieces like "The Night Watch" but also marked by personal tragedy. His wife, Saskia, died here in 1642, just nine months after the birth of their son Titus, the only one of their four children to reach adulthood. In 1658, bankruptcy forced him to sell the house. He lived elsewhere until his death in 1669.

When the house opened as a museum in 1911, the interior had been redesigned primarily as galleries to display the artist's prints and etchings. Nearly the only period touch was the exterior, which had been restored to its appearance in Rembrandt's time.

It remained largely unchanged until 1998. Using as a guide the lengthy room-by-room inventory that Rembrandt's creditors had recorded when he went bankrupt, the museum was then recast as what current museum director Milou Halbesma calls "an honest reconstruction" of the home's interior when



Rembrandt lived there. At the same time, a modern wing was added next door, affording exhibition space, a gift shop and lobby entry to the restored house itself.

The most recent renovation, completed during the museum's closing from November 2022 until last month, moved staff offices next door from the original building, and refit those areas as new exhibition and teaching spaces as well as a dedicated "etching attic" featuring daily printmaking demonstrations.

But the main attraction remains the rooms that have been refurbished to resemble as accurately as possible Rembrandt's living quarters and studio space. The goal

here, as in other artists' home or studio museums, is to make a vivid connection with the sensibility and aesthetic of the artist.

"Everything you see is authentic 17th century" in style and origin, Ms. Halbesma says. That includes the sorts of elegant furnishings Rembrandt favored in the entry hall and its adjoining first-floor rooms: the marble floors and fireplace columns; elaborately carved wooden cabinets; colorfully patterned tile work and translucent blue-and-white Chinese Export porcelain. On the walls are numerous paintings by Rembrandt and such contemporaries as his teacher Pieter Lastman and Jan Lievens, a childhood

friend who himself became a noted painter.

The expensive décor spoke to Rembrandt's financial success, while the gallery-like display of paintings advertised the range of work for sale and provided a setting where the artist could meet potential clients.

Most of the objects on display here did not actually belong to Rembrandt or his household, but some did. One of the most notable is his metal token of membership in the professional artists' Guild of Saint Luke, stamped with his name on one side and the year 1634 on the other.

In the first-floor salon, the family's main living space, is a box bed.

DANCE REVIEW

In Its Founder's Shadow

Martha Graham Dance Company at the Joyce

BY ROBERT GRESKOVIC

Speaking to her audience on April 18, Janet Eilber—artistic director of the Martha Graham Dance Company—hailed the day as falling on the company's 97th birthday. It was also the start of the group's first extended run in the city since the Covid-19 pandemic began.

She noted that the repertory of the current Joyce Theater season includes dances by 13 choreographers. Since taking over the directorship of the company in 2005, the former Graham dancer has made a point of commissioning new works that reimagine or take inspiration from the catalog of 181 Graham dances.

This creative aspect has reflected a steady widening of scope from the troupe's days when Graham (1894-1991) herself remained the sole choreographer. Into the 1960s, Graham was its singular, featured dancer. Each of this season's six different mixed bills includes one full-scale Graham dance alongside more recent Graham-inspired efforts.

The first week presented two world premieres. Each runs about 12 minutes and neither amounts to memorable dance theater, especially in the shadow of Graham's example, flush with choreographic theatrics mated

with notable costume and set designs.

"Get Up, My Daughter" by Annie Rigney—to a score blending Bulgarian folk music with original compositions by Marco Rosano, and with costuming by Caleb Krieg and lighting by Yi-Chung Chen—is the less effective of the two. A program statement about "feminine grief, strength and sisterhood" aims to give dramatic interpretation to the choreography, which features pervasive twistings and upper-body emphases for five wide-eyed women who eventually connect with a lone man. But it all yields much monotony.

Featured on three of the run's bills, "Cortege 2023" by Amadi "Baye" Washington and Sam "Asa" Pratt takes inspiration from Graham's 1967 "Cortege of Eagles," no longer in active repertory, and uses music by Aidan Elias that echoes themes from Eugene Lester's score for that first "Cortege." Dressed in cream-colored, two-piece, unisex outfits by Caleb Krieg for the work's three women and four men, the dance—which evolves into sub-units of dancers coupled and clustered in glowing vignettes against Ms. Chen's inkly lighting—begins and ends with its cast covered by a silky tarpaulin; the conclusion feels premature, occurring just as the dance appears to be on its way to further development.

"Dark Meadow Suite" (2016), Ms. Eilber's 22 minutes of excerpts from Graham's 46-minute "Dark Meadow" (1946), showcases six women and four men displaying sometimes percussive footwork, body-blow accents and angular, acrobatic lifts. The suite is a rewarding and compelling display of vivid activity, but the Eilber inter-

spired "Cave of the Heart" (1946) and for her Eden-themed "Embattled Garden" (1958) remain effective parts of the two presentations. But her abiding interest in integral stage design finds no place in the recent commissions on view here.

"Canticle for Innocent Comedians," a 2022 production conceived by Ms.

"Canticle" keeps the rest of Graham's individual themes, from "Sun" to "Death/Rebirth," reinterpreted by seven other choreographers.

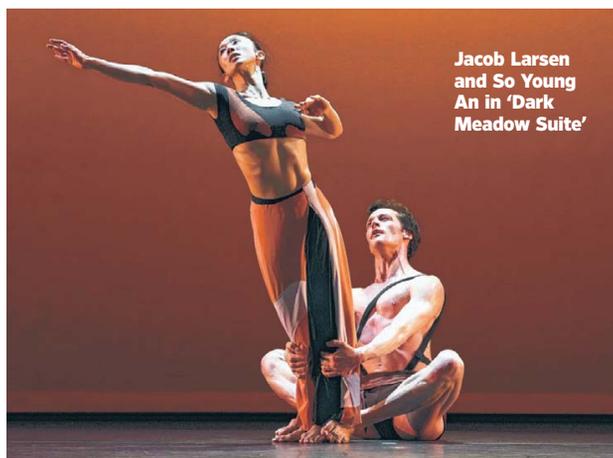
This 40-minute "Canticle" is set to jazz pianist Jason Moran's animated, post-Debussy score of tintinnabulation and proceeds as an array of solos and duets framed by group dances. Sonya Tayeh has "lead choreography" credit for a suite that produces diminishing returns as it swirls all but relentlessly from one theme to another; Robert Cohan's darting choreography in silence for "Wind" and Graham's sometimes rocking "Moon" duet provide some respite from the flow of sameness.

For "Panorama"—Graham's 1935 onrush of dancers and dancing embodying a martial, call-to-action score by Norman Lloyd—23 teenage members of a project of the Graham company and New York City's Department of Education put the choreographer's unforgettably throbbing dance across with infectious energy and excitement. These youngsters, who will appear again at Sunday's matinee, revealed a particularly dedicated and effective budding artist in 18-year-old Genesis Lindo.

Ms. Lindo instantly caught my eye by capturing the stirring focus of Graham's dance theater and showing how it remains a promising vehicle for young people's artistic expression.

Martha Graham Dance Company
Joyce Theater, through April 30

Mr. Greskovic writes about dance for the Journal.



Jacob Larsen and So Young An in 'Dark Meadow Suite'

pretation is presented in a lighter vein than the Graham original. The costuming has been rendered in more fluid fabrics, and the dancing is on a stage free of settings and props, which were signal parts of the longer ballet in sleek, sculptural designs by Isamu Noguchi.

This season, Noguchi's striking stage designs for Graham's Medea-in-

Eilber as an homage to Graham's 1952 work of the same name, unfolds for a cast of 13, costumed uniformly in long-skirted outfits by Karen Young and lighted mostly darkly by Ms. Chen. Because of a lack of documentation, Graham's choreography—except for one segment, "Moon," made possible thanks to film footage from her era—could not be restaged. But today's

SPORTS

The NFL Draft's Greatest Enigma

Anthony Richardson had an unremarkable college career. He might become a star in the pros.

By Andrew Beaton

Kent Lee Platte is a former Navy cryptologist who also happens to be one of the most useful people decoding one of the NFL draft's biggest puzzles: Why a quarterback named Anthony Richardson, who had a completely forgettable college career, is one of the hottest prospects in the sport.

When Platte applied his coding wizardry to football, he invented a metric that crunches a host of pre-draft testing data into a single number for every player. His formula takes information like how fast a player runs and how high he jumps and distills it into what he calls a Relative Athletic Score, a nifty grade that's popular among draft pundits and helpful for quantifying someone's traits compared with his peers.

Richardson was unremarkable at the University of Florida. Unlike the other quarterbacks expected to go atop the draft, such as Alabama's Bryce Young or Ohio State's C.J. Stroud, Richardson didn't light up college scoreboards.

But when the draft begins Thursday, there's a strong chance commissioner Roger Goodell steps onto the stage in Kansas City and calls out Richardson's name early anyway. That's because, according to Platte's metric, Richardson is the most athletic quarterback in modern football history.

"Nobody else comes close," Platte says.

So in spite of everything he hasn't done yet on a football field, he's bursting with the tools that make coaches dream about what he someday might do.

He's big, fast and boasts a powerful arm. He's also the most likely player in this draft to make one team look completely brilliant—or utterly foolish.

"The guy is an absolute physical freak. You're talking about historical athleticism for the position," says Billy Napier, his coach last season at Florida. "This guy's just getting started—still very much a green player."

Whoever takes Richardson will be staking their future to someone



Anthony Richardson's 4.43-second time in the 40-yard dash is among the fastest recorded for a quarterback.

who hasn't played like a superstar. His 53.8% completion percentage last season at Florida ranked 102nd out of 108 qualifying passers in the country. He threw just 17 touchdown passes with nine interceptions while the Gators went 6-6 in his starts.

That hasn't deflated expectations that he will be a top-10 pick. And the best way to understand that disconnect is through Platte's metric.

Relative Athletic Score takes all of the data that gets cooked up during the pre-draft process—from a player's exact height and weight to how fast he runs the 40-yard dash—and translates it into a single number on a 0-10 scale by comparing it to players at the same position. Going into this draft process, Platte figured

Richardson would get high marks because his athleticism wasn't exactly a secret.

"Then he comes in and blows it out of the water," Platte says.

Richardson received a perfect 10 as the highest-rated quarterback in a database that goes back to 1987.

Richardson—who since the 11th grade has called himself Cam Jackson, after the multitasking MVP-winning quarterbacks Lamar Jackson and Cam Newton—actually took the top spot from Newton. His testing was so off the charts that he recorded the third-highest raw score among the 20,000-plus players at any position over the years.

So what does he do so phenomenally that produced such an incredible score? Richardson himself actually

explains it pretty succinctly.

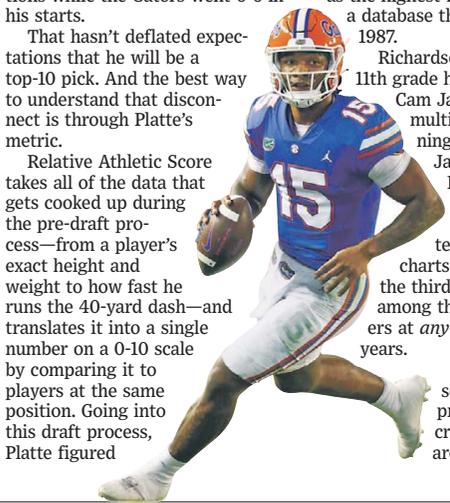
"I'm able to do everything on the field: run over people, jump over people, run past people," he said at the combine.

At 6-foot-4 and 244 pounds, Richardson can definitely run over people. He can jump over them, too: his vertical leap (40.5 inches) and broad jump (10 feet, 9 inches) were both the highest ever for a quarterback at the combine. And there's no doubt that he can blow past defenders—his 4.43-second time in the 40-yard dash is among the fastest recorded at the position.

But whether he booms or busts as a quarterback in the NFL will also come down to whether he can improve as a passer.

The chasm between what Richardson has shown he is capable of and what he has actually done is enormous. He started for just one full season in college, and that year wasn't especially impressive.

His relative lack of experience is also part of the sales pitch. At just 20 years old, with 393 collegiate



passes, Richardson is expectedly less polished than his peers.

By contrast Young, the quarterback favored to be picked first overall by the Carolina Panthers, threw 949 passes during his career at Alabama. That's why the optimistic view on Richardson is that he's a freakish athlete and with more time he can tap in to his vast potential.

Napier notes other circumstances that have factored into Richardson's development. His first season in college, 2020, was the year upended by the pandemic. During his sophomore year, Florida's coach was fired midseason. And when Florida had a so-so season in 2022, Napier was a new coach installing a new offense for not just Richardson but the entire team.

Those are also the reasons Napier says Richardson's subpar statistics undersell his actual talent. "I don't necessarily know that the completion percentage is a reflection of his overall ability," he says.

Recent history has also shown teams are willing to roll the dice on prospects like Richardson with the belief that physical superiority and the ability to thrive as a dual-threat passer are so valuable in modern football that it's worth the risk that a player can improve other parts of his game, like passing accuracy.

The Buffalo Bills were rewarded for that notion when they took an unproven passer who struggled to hit his targets out of Wyoming. Then after a rough couple first seasons, Josh Allen grew into one of the NFL's best quarterbacks.

The same can't be said yet of Trey Lance, who also had impressive physical traits but had little experience in college at North Dakota State. Nonetheless, the 49ers traded three first-round picks to move up and take him third overall in 2021. Between injuries and lack of opportunity since then, he has seen limited action so far in San Francisco and whether he succeeds as a pro is still an uncertainty.

Napier thinks Richardson's gamble is already paying off. He could have returned to Florida for another year to play better and come off as less of a risk to NFL decision makers. But recent weeks have indicated that he didn't have to do that—Richardson's likely to go off the board early anyway.

"He bet on himself," Napier says. "And I think he's proved to a lot of people that he may have been right about that."

The WSJ Daily Crossword | Edited by Mike Shenk

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FREE ASSOCIATION | By Justin Werfel & Jeff Chen

Across	36 Knock loose	59 Practice of great interest	9 Tale-telling Jakob or Wilhelm
1 Mosey	38 Skips	61 Lisa of "High Fidelity"	10 Green gamer
6 Justice Dept. bureau	39 Cassis drink	62 "Wayne's World" catchword	11 Spots of bother?
9 Makes like a beaver	40 Orphan without pupils	63 Endowed professorship, often	12 Sound from a fan
14 They take turns on road trips	41 They're in the wrong business	64 Sends forth in bulk	13 Org. watching over 21-Down
15 Assam honorific	43 "Blazing Saddles" and "Young Frankenstein," e.g.	65 Rte. suggester	21 Market watched over by 13-Down
16 Valium maker	44 Citation abbr.	66 Dales' partners	22 Ages
17 Leaves	45 Charming person		26 Pindar or Horace
18 "OMG BAHAHA!"	47 Kitty	Down	27 U2 frontman
19 Order in the Supreme Court's courtroom, e.g.	48 Asks, as for money	1 Took in	28 SSA-issued digits, e.g.
20 Garland, e.g.	53 "No charge," and a description of five places in this puzzle	2 Burned gift of old	
23 Rare thing at a tearjerker		3 Thorny matter?	
24 Munch on, cutesy-style		4 Clear the way for	
25 The Tick's nonsensical battle cry	57 Hazard in a classic board game	5 L'Oréal polish brand	
27 Boring parts	58 Supposed location of Homer's tomb	6 Out	
31 Do a lexicography job		7 Two-beat gait	
		8 Genre for Bogart	

- 29 Pre-weekend letters
- 30 Matches, at the table
- 31 Brand of chocolate or soap
- 32 Send forth
- 33 Sportswear brand promoted by K-pop's BTS
- 34 "___ Be Her" (Johnny Cash song)
- 35 "The Puzzle Palace" org.
- 37 Racing circuit
- 39 Activity in which you cast on and cast off
- 42 "Victory!"
- 43 ___Tzu (toy dog)
- 46 Holders of hearts
- 47 Pindar and Horace
- 49 Trace
- 50 Fish dish
- 51 Routine
- 52 Imminent danger
- 53 You can earn PanCoins in its rewards program
- 54 50-Down option
- 55 Education acronym
- 56 Rhythmic gymnastics prop
- 57 "The Twilight Zone" channel
- 60 Abbreviated sign-off

Previous Puzzle's Solution

OCT	ACRID	ASAP
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LIU	ARESO	TAUPE
INSIDE	VOICE	MEN
ACER	PENROD	PRO
MAISK	SLEEP	SIAN

Man City Asserts Its Dominance

By Joshua Robinson

Manchester, England
EVEN THROUGH THE MONTHS when Arsenal seemed firmly in charge of the Premier League title race, the club knew that trouble was lurking toward the end of the schedule. There was one game in late April, a trip to Manchester City, that threatened to define its season.

If it could dig in for 90 minutes and somehow produce a positive result, then Arsenal would prove that it had always belonged in this heavyweight fight. It was here to defend the work it had put in to hang with City over 32 grueling matches.

But on Wednesday night, in the most hotly anticipated game of the season, Arsenal's resistance lasted barely six minutes.

City playmaker Kevin De Bruyne showed the visitors just how overmatched they were when he marauded through a seam in the Arsenal defense and curled a low shot around goalkeeper Aaron Ramsdale. The early goal set the stage for a commanding 4-1 victory that was never as close as the standings suggested.

Technically, Arsenal returned home to London still in first place, with a two-point lead over City. But the gap is more of an illusion than a genuine advantage:

City has played two fewer games and has seized control. That much was clear in the Arsenal players' body language after conceding the third goal. All 11 stood with their hands on their hips, realizing that at least one club in this league remained far above their level.

For City, a potentially historic season is now coming into focus. Not only is it closing in on the Premier League trophy, the club has two more pieces of silverware in its sights. There is a Champions League semifinal against Real Madrid coming up next month and the FA Cup final against Manchester United on June 3. One by one, City has begun picking off its rivals at the business end of the season.

The club, one of the most lavish spenders in soccer and owned by a member of Abu Dhabi's royal family since 2008, is poised to claim its fifth Premier League title in the space of six years.

The irony is that City is building a dynasty in the very league that has accused it of vast financial impropriety dating back more than a decade.

The case against City, which denies any wrongdoing, alleges that the club deliberately concealed the value of various personnel and sponsorship contracts in order to dodge league rules

spending. The proceedings could ultimately see the club docked points, but it won't be settled for months.

As recently as mid-March, Arsenal was looking at an eight-point lead over second place. But a string of three confusing and chaotic draws caused Arsenal to take just three points from a possible nine before facing City. Twice in those games, they led 2-0, only to be pegged back. And in the third, against Southampton last Friday, Arsenal had to scramble back late to 3-3.

The defeat here made it three points from a possible 12.

City, meanwhile, has won seven consecutive Premier League games to reel in its prey. Defender John Stones made sure of it with a header to make it 2-0 just before halftime before De Bruyne added the club's third in the 54th. Erling Haaland then made it 4-1 in stoppage time.

In the final accounting of Arsenal's season, the sloppy goals it allowed in the three draws before coming to Manchester will prove more damaging. But the punishment meted out by City on Wednesday made the situation clear.

Even Arsenal's best season in two decades barely disturbed English soccer's modern superclub.



Manchester City's Kevin De Bruyne, right, scored two goals in a 4-1 victory over Arsenal.

OPINION

The Perfect Democratic President



WONDER LAND
By Daniel Henninger

President Biden won't negotiate, doesn't do press conferences, does only canned events, can't maintain focus, has minimal factual grasp and his foreign-policy activity is totally ceremonial. So naturally he's running for a second term. With the total support of the Democratic Party in Congress.

Mr. Biden likely wouldn't be running if his opponent were any of five or so Republicans not named Trump. A presidential debate next Tuesday evening against any of them would be a catastrophe for the incumbent.

Most Americans of any age or party affiliation don't want Mr. Biden to run again. But the odds are strong—affirmed by the midterm election results—that even more voters don't want Donald Trump to be president again.

Manhattan District Attorney Alvin Bragg's pseudo-indictment of Mr. Trump worked like clockwork. Annoyed Republicans increased their support for a Trump nomination, reassuring Democrats they could pull off the improbable re-election of their 80-something candidate.

The standard political model holds that politicians do what they gotta do to become the party in power. But even that pragmatic standard assumes the party's path will be diverted by the interests of the person who has made it to the top of the presidential greasy

pole. Not this time.

I've come to think of Joe Biden not so much as the commander in chief as the maître d' in chief, master of the happy handshake. What needs explaining is the current disconnection between professional Democrats and most everyone else over the idea of continuing Mr. Biden's official-greeter presidency. What do they see that normal people don't?

Last year, professional Democrats seemed in sync with noncareer Democrats discomfited by the implications of the world's most powerful man's constant gaffes. Articles appeared suggesting primary challenges to Mr. Biden might come from prominent party governors—California's Gavin Newsom, Illinois's J.B. Pritzker or Gretchen Whitmer in Michigan.

Then almost overnight, the party seemed to embrace the idea of a second Biden term. Yes, the close midterm results were a triggering event, and the prospect of a Trump rerun helped. But I think the Democrats realized they had backed into a system that suits them to a T—the *non compos* presidential model of American politics.

Not a joke. Since at least Woodrow Wilson's presidency, progressives have tried, with success, to make the states subject to the authority of administered bureaucracies in Washington. "Inside the Beltway" is a phrase mentioned frequently here, but during the first Biden term Washington has become more like a black hole, with the entire country being pulled into its gravitational force field.

Their control of the bu-

reaucratic levers today is unprecedented. Unless you are a reader of the editorials in this newspaper, you would have virtually no idea of the relentless mandating activity of the people running this administration's departments and agencies. A significant piece in these pages days ago by Phil Gramm and Pat Toomey summarized the scale of this juggernaut. If you missed it, read it.

The non compos governing approach gives the party's progressives free rein.

As noted, even a progressive Newsom or Pritzker presidency would just get in the way of the comprehensive agenda now being executed by progressive academics and former congressional staffers allied with Sen. Elizabeth Warren. They are, for instance, writing expansive interpretations of the implementation rules for the \$400 billion of climate subsidies Congress just passed.

The suggestion that Mr. Biden should avoid the curse of second-term failure is about him personally. It's irrelevant to what the activists running the agencies could do daily. The EPA's just-announced 2027 deadline for tailpipe emissions may be unachievable, but so what? The marching order is a done deal. There would be more of that in a second term.

A beside-the-point president is the best thing that has

ever happened to the progressive centralization project. That is why Washington's Democrats would embrace a Kamala Harris succession. A tip of the hat, incidentally, to departing Biden domestic adviser Susan Rice, the former Obama operative who surely has helped design this passive presidency model.

The greatest peril is foreign policy, whose execution requires presidential leadership. Kissinger needed Nixon, Shultz needed Reagan, and Acheson had Truman. Antony Blinken is on his own, and it shows, as allies like Saudi Arabia and France flirt with China. The U.S. needs to increase spending on national security beyond 3% of gross domestic product. No matter what happens in the world, these Democrats won't do that.

The cliché happens to be true: It's early. The Hunter anvil hangs over Mr. Biden, along with a fragile economy and tense world. All kinds of stuff hangs over Mr. Trump. We are in a familiar phase, with opinion polls representing reality. They show Mr. Trump with a big nomination lead, thus the coverage has defaulted the election to a Biden-Trump grudge match. Like the Bragg indictment, that advantages the incumbent's sleepwalk to re-election.

To paraphrase Dirty Harry, Republicans staring down this barrel have to be asking themselves one question: Do you think Donald Trump will run from here until November 2024 saying the 2020 election was rigged and stolen? If he does—and of course he will—you lose.

Write henninger@wsj.com.

BOOKSHELF | By Meghan Cox Gurdon

Thou Art A Blab, He Said

Tudor Children

By Nicholas Orme
(Yale, 265 pages, \$30)

"The child is father of the man," wrote Wordsworth, capturing the ancient idea that the early years of life shape the later ones. There's a corollary in the notion that adults can understand themselves by casting back to the children they were. This kind of introspection is something modern people do almost reflexively; no biography published today would be considered complete without a few chapters devoted to the subject's childhood. Yet what appears to us a logical method of self-understanding seems not always to have prevailed, to judge from Nicholas Orme's "Tudor Children," a history of English childhood in the turbulent era between the medieval and Stuart monarchs. In the few extant biographies and autobiographies from the era, according to Mr. Orme, there are scant reflections on childhood that would allow historians to work backward.

Adult records about children are "similarly scarce," writes Mr. Orme, a professor emeritus at Exeter University and, in the case of the Tudor young, a skilled hunter of breadcrumbs. England underwent wrenching cultural change in the years 1485-1603, turbulence that, along with the ordinary travails of long-ago life, children would have experienced along with their elders. But how it was for them exactly—well, that's where the breadcrumb hunting comes in.

Mr. Orme has tracked the historical record and filled some of its gaps by compassing the art, music and literature of the period. By means of deduction and extrapolation, he's amassed all sorts of plausible insights into the lives of Tudor children: how they came into the world and got their names; what they studied and how they worshiped; what they ate and sang and wore; how grown-ups expected them to behave. Moneyed Tudor parents seem to have worried about their youngsters picking up foul language from the servants, but of how 16th-century children actually spoke there is no transcript. "The nearest we can reach," the author writes, is by looking at early Tudor texts used by teachers "trying to get boys to understand Latin by translating everyday words and phrases." A schoolbook from 1500 allows us to "eavesdrop," as the author puts it, on youthful remarks such as "Thou art a blab" and "He is the veriest coward that ever pissed."

Mr. Orme has found abundant proofs of play among Tudor juveniles, though, again, many historical references are glancing or indirect. It appears that the young played with rattles, dolls, spinning tops, hobby horses and pressed-metal figurines. Children bowled and batted and whacked tennis balls. They threw knives in a game charmingly called "mumble-the-peg" and flicked cherry stones in a game called "cherry-stone." Play at the time extended to activities that by modern standards, Mr. Orme writes, "contained a stratum of insensitivity towards birds and animals with which it is now hard to sympathize," such as bear-baiting, cockfighting and a grisly entertainment that involved half-burying a cockerel in the earth and using it as a target.

Considering aspects of Tudor childhood in turn, Mr. Orme reveals rather than explains the seismic shift in English life that took place under the Tudors: namely, the crown's break with Rome. In 1485, England was a Catholic country, home to richly decorated churches, wealthy friaries and monasteries, and palaces of ecclesiastical study. Children memorized their prayers in Latin; church was not compulsory for them; school was suspended on holy days; and dairy was forbidden during Lent. By 1559 the state had appropriated church properties, stripped churches of ornament and outlawed Catholic ritual. Children memorized their prayers in English; church catechism was obligatory; holy days were pared down; and Lenten fasting was less strict.

In Tudor times, the young played with rattles and spinning tops, said their prayers, made cheeky remarks, and were not always kind to animals.

The lives of Tudor children and adolescents were necessarily touched by these changes—and others, such as the disappearance of boys from altar service—but whether young people noticed or reacted to the Reformation we don't know. Mr. Orme notes that the Protestant gentry "retained the medieval practice of saying prayers at home and . . . the reading of godly teaching." Children in such houses would surely have participated. Members of families that remained Catholic, so-called recusants, practiced their religion in secret and, if they were rich, might send their sons abroad to France, Spain or Italy to be educated.

Tudor boys and girls were expected not to eat like barbarians and not to squander their time in idleness. Meeting an adult, the polite youth should remove his cap, perhaps holding it low in both hands "to screen his codpiece." Children, too, were supposed to be silent at mealtimes (unless addressed directly), though at this remove we have no way of gauging the gap between parental wishes and reality.

Even the size and composition of households remains somewhat mysterious. Wealthier families tended to be larger than others, because high-ranking men and women married at younger ages than those in the lower classes; rich couples were also more likely to outsource the feeding of their newborns to wet nurses, thus shortening the spans between pregnancies. In 1538, Henry VIII, as head of the new Church of England, ordered that parish clergy keep registers of all births, marriages and deaths. Alas, Mr. Orme writes, "not many registers now exist from so early a date and even later ones are often poorly kept."

There is something inherently frustrating about a book that humbly admits that it can't achieve what it would like to achieve, but it is hard to fault Mr. Orme for failing to deliver. "Tudor Children" is the first general study of the subject. It is crisp and factual and, with lots of enlivening illustration (prints, portraiture and pages of illuminated manuscript), beautiful to regard. In his long career, Mr. Orme has written numerous works of English history. He's done a yeoman's job here of sleuthing out the details of childhood from an epoch that doesn't seem to have been terribly interested in recording them.

Mrs. Gurdon, a Journal contributor, is the author of "The Enchanted Hour: The Miraculous Power of Reading Aloud in the Age of Distraction."

Joe Biden's Second Basement Campaign

By Karl Rove

A three-minute video issued at the crack of dawn Tuesday was a strange way to launch President Biden's re-election bid. Granted, President Obama announced he would run for a second term by video in April 2011, but no one questioned his energy and mental acuity.

Not so for Mr. Biden. Many doubt he can last another term. If he's re-elected and serves four years, he would be 86—older than all but seven former presidents ever lived, including Jimmy Carter, who is 98 and left office at 56.

You would think the president's team would try assuaging the public's concerns by putting a vigorous, sharp Mr. Biden on display in person. Instead we got a video.

The short film appealed almost exclusively to the Democratic base, elements of which aren't enthusiastic about a second Biden run. The video featured Democratic go-to issues—abortion and voting rights—and familiar attacks, including the charge that Republicans want to gut Social Security to pay for tax cuts for the wealthy. It was all pro forma and blasé.

Dobbs v. Jackson Women's Health Organization gave Democrats an opening on abortion, but the reproductive-rights lobby's absolutist position of no restrictions in

the second or third trimester isn't so popular in general elections. Consider the big victories of pro-life governors in Florida, Georgia, Iowa, Ohio and Texas last fall.

Voting-rights reform isn't necessarily a winner either: Brian Kemp, Georgia's Republican governor, signed a major election-law reform and soundly beat the High Priestess of Voting Rights, Stacey Abrams, for the second time, even after Mr. Biden and others criticized the state's law.

He hid away in 2020, and now he releases a video to announce he's running again.

Missing from Tuesday's video were mentions of the inflation ravaging family budgets, recession worries, Russia's war on Ukraine, the Chinese threat, crime and the crisis at the southern border. These issues are why the RealClearPolitics polling average shows that nearly 65% of respondents say America is on the wrong track. Mr. Biden doesn't like talking about these issues, but he won't be able to avoid them during the campaign.

Some Democratic poohbahs posit that Mr. Biden needed to announce now, instead of later in the spring or early summer as origi-

nally thought, to start raising money. If so, that's worrisome. Abundant money should be available for a sitting president. But perhaps donors are resisting Team Biden.

Tuesday's video will leave no strong imprint, and news of the president's announcement will be drowned out by the debt-ceiling fight in Congress, which heats up this week with a crucial House vote. West Wing politicians may not have a problem with that, thinking that a low-key campaign by video may work in 2024, just as campaigning from that Delaware basement did in 2020, especially if the election is a rematch with Donald Trump.

It might not play out that way. Take the debt ceiling. Speaker Kevin McCarthy faced a difficult challenge in corraling a majority to pass a GOP bill that raises the debt ceiling while reducing spending. There are 222 Republicans, and 16 had never voted to raise the debt ceiling. Mr. McCarthy could easily have fallen short.

But on Wednesday the speaker's Limit, Save, Grow Act passed 217-215. Now the White House has a problem. An April 11 American Viewpoint poll of 87 battleground congressional districts shows that 37% of likely voters favor the administration's position of raising the debt ceiling without cutting government spending while

50% want spending cuts to accompany any debt-ceiling increase.

Elements of Mr. McCarthy's package are even more popular, according to the poll. Recovering unspent Covid-relief money is a 77% to 14% winner in these districts. Strengthening work requirements for adults receiving government benefits garners 62% in favor vs. 27% opposed. Reducing nondefense spending to pre-inflationary levels and limiting future spending growth earns 53% support compared with 35% opposed. Mr. McCarthy has a winning message for swing voters.

Mr. Biden's team may believe Tuesday's video puts them on a path to legislative triumphs this year and will help a fragile, sometimes befuddled president overcome Mr. Trump's rearview-mirror campaign of rage, grievance and conspiracy theories. But what if Republicans keep focused on popular policies, as Mr. McCarthy is doing? What if the GOP decides it doesn't want a rerun of 2020 and 2022 and leaves Mr. Trump on the sidelines? Democrats would need more than easily forgotten three-minute videos.

Mr. Rove helped organize the political-action committee *American Crossroads* and is author of "The Triumph of William McKinley" (Simon & Schuster, 2015).

Mammograms Can Promote Heart Health

By Bobby Jindal
And Chirag Parghi

Fifty years of technological advancement revolutionized the treatment of heart attacks and increased survival rates, but heart disease remains the nation's leading cause of death for women. While we have made dramatic progress, efforts to prevent heart disease have been disappointing, especially for women. Yet a standard feature of women's health—mammography—offers a promising gateway for cardiovascular screening through breast arterial calcification, or BAC.

BAC consists of visible deposits of calcium in breast arteries, which can be seen on mammograms and should prompt doctors to screen for heart disease. Since the X-ray primarily screens for breast cancer, this finding is rarely reported and leaves most patients unaware of the amount

of BAC on their exams.

Women who get mammograms reduce their 10-year risk of death from breast cancer by more than 40%. This finding could conceivably lower mortality rates for heart disease, too. Doctors usually screen patients for heart disease by evaluating traditional

Calcium deposits in breast arteries can indicate a problem.

risk factors such as high blood pressure and cholesterol, diabetes and family history. A doctor might order a CT scan to evaluate coronary-artery calcification or calcium deposits in heart arteries. Though plaque buildup and calcification in the arteries supplying breast tissue can have similar causes as coronary-artery calcification, it doesn't receive

the same attention as calcification in other blood vessels. Women with BAC are 51% more likely to develop heart disease than those without BAC, and the Canadian Society of Breast Imaging is working to share this finding with doctors.

The use of machine-learning software in medical imaging has led to new incidental findings. In mammography, BAC can be quantified to evaluate the risk of cardiovascular disease and death. The implications for women's health extend beyond heart disease: High levels of these deposits are found in patients with end-stage kidney disease and diabetes.

Regulators must embrace technology that helps bridge gender gaps in healthcare. Although the Food and Drug Administration has allowed quicker development tracks for some software tools that help doctors make clinical de-

terminations, government classification and approval for artificial-intelligence-enabled products can take years. The Centers for Medicare and Medicaid Services should make establishing payment codes for products involving women's heart disease a priority to prompt private insurers to cover new service lines.

Heart attacks in women have been poorly understood because of insufficient research and screening. BAC measurements can take advantage of cancer screenings to improve cardiovascular health.

Mr. Jindal served as governor of Louisiana, 2008-16, and a U.S. assistant secretary of health and human services, 2001-03. He serves on the board of U.S. Heart and Vascular, a provider of cardiovascular services. Dr. Parghi is a breast radiologist and the chief medical officer of Solis Mammography.

OPINION

REVIEW & OUTLOOK

The College Board's Secret Apology

Gov. Ron DeSantis is credited with forcing a rewrite of a new high-school AP class in African-American Studies, after Florida balked at such lesson topics as “Black Queer Studies.” Denying pressure, the College Board said the revisions were pedagogical: “This course has been shaped only by the input of experts and long-standing AP principles and practices.”

Private emails show it wasn't honest about Ron DeSantis and African-American Studies.

Yet its own faculty advisers privately castigated this as dishonest spin, according to emails we obtained via open-records laws. “I have patiently and quietly watched the ubiquitous interviews and media assertions that AP would not make changes at the behest of any group beyond professors, teachers, and students,” wrote Nishani Frazier, a University of Kansas professor who sits on the AP course's development committee. “If this is so, which student, professor, or teacher suggested adding black conservatives to the course over Combahee River Collective?”

Ms. Frazier continued: “We all know this is a blatant lie. In fact, the major changes which occurred came from my unit—and not once did AP speak with me about these changes. Instead, it rammed through revisions, pretended course transformation was business as usual, and then further added insult to injury by attempting to gaslight the public with faux innocence.” The course was “edited behind our backs,” she wrote. “What is unsaid is the failure of AP to recognize both its own institutional racism and how its own lies and capitulation precipitated the creation of a monster of its own making.”

Another professor on the curriculum committee, David Embrick of the University of Connecticut, apparently forwarded Ms. Frazier's cri de coeur to a sociology professor at Trinity College. “Yikes...Nishani is right here,” Mr. Embrick said. The sociologist's reaction: “Dude, College Board is f— over y'all.”

The College Board's reply came from Trevor Packer, who has led the AP program since 2003. “While we stand by our statement that there has been no collaboration or exchange of ideas with Florida,” he said, “Nishani's point below is right and true: edits made to the framework that were not adequately discussed with the Development Committee are a violation of our core processes for developing AP frameworks. We are deeply sorry for that breakdown.”

This seems to contradict the College Board's claim that the course was shaped only by experts and established practices. Note Mr. Packer's denial of “collaboration” with Florida. Was the College Board working on its own to make the class more palatable to red or purple states?

Facing faculty dissent, though, Mr. Packer

promised to backtrack. “To rectify this matter,” he said, “we think we should provide the committee with great flexibility between now and the end of the second year of piloting: to change the framework we released on February 1 so that you are proud of it as an authentic representation of an introductory course in this discipline.”

The College Board hasn't been straight about any of this.

Two days later, Mr. Packer sent committee members a draft statement. Its language, he said, reflected their “good feedback,” in which “you asked us to keep our apology to you separate from a public apology for not pushing back immediately on Florida's attack.”

He also asked for advice on whether to reveal his plan to re-edit the class to the committee's liking: “Would you prefer that we keep the paragraph I've highlighted in yellow, or would you prefer that we keep that option private, just among you?” The highlighted text says the committee may further alter the curriculum “to achieve an authentic representation of a college-level course in this discipline.”

Was that deemed too honest? It doesn't appear in the statement issued by the College Board the same day, which blandly says the committee may make changes “if they decide to do so.” In another message, Mr. Packer said he used “personal email addresses and bcc'd the two committee members who live in Florida, to protect them from persecution.” That shields them from open-records laws.

* * *

The College Board told us in a statement that its editorial decisions “were consistent with our typical approach of making all AP courses available across the country.” Mr. Packer's apology was “focused on a process issue” of failing to apprise the committee “why we were or were not incorporating specific feedback.” Then the College Board did another PR spin cycle. After we asked for comment, it tried to front-run our reporting by publicly announcing that the African-American Studies class will be updated soon, so it “best reflects this dynamic discipline.”

If changes are coming to make it “authentic” again, what might they be? Ms. Frazier argued in a February email that the course doesn't sufficiently teach “queerness,” “black rage as strategizing tool,” “the resurgence of policing in policy and militarization of policing,” “incarceration,” or the Black Lives Matter movement.

“Who is AP to decide any of this without the professors of record?” she said. “I want to make myself clear for a final time—this is not up for debate.” Is that what the College Board is planning next for high-schoolers?

Cooking the IRS Study Books

The Internal Revenue Service isn't saying how it will spend all of its new \$80 billion windfall from Congress, but the political shenanigans over a proposed new IRS tax filing system aren't cause for comfort. The agency is employing progressives to study how to make the tax collector the first and last arbiter of how much Americans owe.

Most of the \$80 billion will go to turbocharging audits, but the Inflation Reduction Act also earmarked \$15 million to study a bad idea. Progressives led by Sen. Elizabeth Warren want to create what they call a “free direct efile tax return system,” which would put the agency in charge of both calculating and auditing taxes. This would end America's longtime voluntary system that lets taxpayers determine their tax, subject to IRS review. The law instructed the IRS to hire an “independent third party” to examine the idea.

The IRS has announced that its notion of a neutral investigator is New America, a left-leaning nonprofit whose top officials include Obama Administration alumni and a former aide to Hillary Clinton, and which is already on record praising the Warren plan. The IRS also tapped to work on the project Ariel Jurow Kleiman, a

Loyola Law School professor, who wrote a paper calling on the IRS to adopt a Warren-like program, “one that includes the maximum amount of taxpayer information and requires the least amount of taxpayer input.” Why bother with the ruse of an “independent” study?

As it happens, the IRS has already been told by a truly independent outfit that Americans hate this idea. House Ways and Means Republicans recently discovered the IRS received a report in February from independent adviser MITRE on public attitudes toward a system in which the IRS calculates taxes.

The findings: A mere 37% of tax filers with simple returns would use an IRS tax preparation service. The number drops to 29% if the system doesn't include a similar state tax-prep function. Among the nearly 50% of respondents who say they want to stick with their current commercial software, among their reasons was, “I don't think it's the IRS's role to prepare taxes.” Sensible thinking.

The IRS kept mum about this survey, even as it moved to hire a consulting group that it expects to reach the conclusion the agency and Sen. Warren want. They're from the government and they're here to tax you more.

McCarthy Gets a Debt-Ceiling Win

House Republicans passed their first big legislative test on Wednesday as they passed their bill to increase the federal debt ceiling with no help from Democrats. Had the vote failed, House Republicans would have lost all leverage over the debt ceiling, and the Senate and White House would have cut their own deal and then jammed the House.

President Biden says he won't sign the House bill, but the pressure is now on him to negotiate. The same for the Senate, which will have to pass a bill of its own or risk a U.S. default. Democrats can say they still won't negotiate, but that is harder to do now that the House has passed a bill to raise the limit.

The fight now will be over the spending and policy reforms in the House bill. The legislation caps annual growth in discretionary spending at 1% a year, which the Congressional Budget Office estimates would reduce deficits by \$3.2 trillion over the next decade. That's out of more than \$60 trillion in expected spending, so it's hardly austere.

The plan also cancels the President's student loan write-off and blocks a proposal to cap borrower loan payments at de minimis levels, which combined would save \$460 billion from

2023 to 2033. A White House press release claims these measures “hurt students.” Since when is requiring borrowers repay their loans a form of punishment?

The GOP offer would also impose modest work requirements for Medicaid, food stamps and the Temporary Assistance for Needy Families program. According to the President, making people work or volunteer to receive government assistance is “wacko.” Most Americans must be crazy because they support work requirements for able-bodied adults.

The disappointment is that Speaker Kevin McCarthy had to rewrite some of the bill early Wednesday to appease eight Members from the Corn Belt who want to preserve tax credits for ethanol and other biofuels. The bill now retains several tax credits for biofuels and carbon capture. These concessions don't bode well for the GOP's ability to stick together to roll back the Inflation Reduction Act's green-energy handouts to business.

There is heavy political lifting to come because the House Republicans will have to compromise with the Senate and Mr. Biden. But getting even a couple of these reforms would be no small political and policy victory.

LETTERS TO THE EDITOR

The Proof Is in Justice Thomas's Opinions

The question of whether Justice Clarence Thomas is susceptible to undue influence (“Bloomberg Flings Mud at Clarence Thomas” by James Taranto, op-ed, April 26) is most easily answered by reading his opinions. More than any other recent justice, Mr. Thomas has elaborated a clear set of principles that guide his judgments and a predictable methodology for interpreting and applying the law.

When a judge applies flexible standards, trying to do what is “right” in the circumstances of the moment, the results can be unpredictable and one can never be sure exactly what motivates a decision. But with Justice Thomas, the principles and the methods are there for the world to see. His employment of them has been remarkably consistent. Deviations would be obvious. When the history of the judiciary in our era is written, Mr. Thomas will be seen to have been one of the most principled judges of all time.

JOSEPH A. MORRIS
Chicago

Mr. Morris was counsel to the chairman of the U.S. Equal Employment Opportunity Commission when Mr. Thomas was chairman.

Mr. Taranto avoids the main issue: Justice Thomas accepted lavish gifts for over 10 years. The justice lacked judgment, on a grand scale.

CAROL RAYMOND
Santa Fe, N.M.

Mr. Taranto shows that the recent shoddy press coverage of Justice Thomas's financial disclosures is attack journalism, but he fails to identify the motivation. The left has concluded that the Supreme Court will be in the hands of a conservative majority for the indefinite future, and so it seeks to undermine the authority of the court with the American people.

TIM KELLY
Naples, Fla.

As one of the many who mourned Mr. Taranto's resignation from the daily Best of the Web column but cheered his promotion to editorial features editor, I say bravo for his recent series of articles. I've long admired Mr. Taranto's ability to skewer ill-founded positions and am very pleased to see his bylined commentary.

DEAN HENNINGS
Pearland, Texas

FHFA Responds on New Federal Housing Rule

Regarding your editorial “Upside Down Mortgage Policy” (April 22) on risk-adjusted mortgage fees charged by Fannie Mae and Freddie Mac: The new Federal Housing Finance Agency policy won't impose higher fees on higher-credit-score borrowers than on lower-credit-score borrowers, all else equal. More broadly, Fannie and Freddie don't subsidize borrowers based on their credit scores.

Many borrowers in the highest credit-score tier, as well as those making larger down payments, actually will pay less under the new framework than under the prior framework. That is the opposite of “socializing risk,” as you put it. Most of those who do see increases will experience modest changes. The average borrower's mortgage rate would increase by about 0.04 percentage point, or \$10 a month. In comparison, interest rates increased by 4 percentage points in 2022.

Your editorial fails to recognize that modestly higher fees will en-

hance Fannie and Freddie's safety and soundness, which will benefit taxpayers. And targeted fee eliminations based on income, not credit score, are primarily supported by higher fees on loans for second homes, investment properties and cash-out refinancings.

FHFA updated Fannie and Freddie's pricing framework to ensure they are compensated appropriately for the exposures they guarantee. That is exactly what should be expected of a safety-and-soundness regulator.

SANDRA L. THOMPSON
Director, Federal Housing Finance Agency
Washington

It's hard to imagine a more divisive policy than the student-loan forgiveness, but the Biden administration has matched it with its new mortgage policy. It has achieved “fairness” by punishing the more hardworking, responsible people. Who is next?

RICHARD R. HORTON
The Villages, Fla.

What Do You Want Out of a Lawn Mower?

I can relate to Mark Naida's op-ed “Yard Work Can Be a Lawn Walk” (April 20). My father regularly used a reel lawn mower, even when he was over 90. I also use a reel lawn mower, purchased for \$5 at a yard sale, to cut my little piece of front lawn as well as my neighbor's larger abutting one. It takes about 15 minutes and the *click-click* sound is peaceful in-

stead of irritating. Thank you, Mr. Naida, for extolling the pleasures of a simpler life.

CYNTHIA G. BIRD
Livermore, Calif.

Let Your Children Lose; Let Your Customers Win

My mother-in-law, who owned a hotel in Lakewood, N.J., was an excellent card player. When she played cards with my children, she used the same method as Bob Brody (“Why I Let My Granddaughter, 4, Lose,” op-ed, April 19). Sometimes she let them win, but sometimes she beat them. When she played with customers, her plan was different. She always let the customer win. They returned to the hotel year after year to play cards with her, and left feeling great as they beat her every time.

JANE FEDER
Long Beach, N.Y.

The lessons from losing, as described by Mr. Brody, are learned by children even when participation trophies are given. This was made clear to me during a move from my family home, when none of my children would claim the trophy, found at the bottom of the closet, marked: “Fifth Place Winner.”

DOUGLAS BISER
Towson, Md.

Immigration Isn't the Issue

Your editorial “Incredible Shrinking Japan” (April 17) claims that in the U.S. “many on the right want to stop all immigration.” I am a conservative and I hang out with “many on the right.” All of them want to stop illegal immigration, but not all immigration, whereas the left doesn't distinguish between the two.

TOM EATON
Tallahassee, Fla.

CORRECTION

John Raisian died at 73. His age was misstated in the April 25 op-ed “John Raisian, a Guardian of Freedom.”

Letters intended for publication should be emailed to wsj.letters@wsj.com. Please include your city, state and telephone number. All letters are subject to editing, and unpublished letters cannot be acknowledged.

Pepper ... And Salt

THE WALL STREET JOURNAL



“A successful meeting. Only one member left in a rage shouting obscenities!”

OPINION

How to Deal With ‘AI Grief’

By Suzy Welch

Isn't it fun to go out with friends to a buzzy bar in the coolest part of town, order some drinks and pizza, and end up talking about . . . ChatGPT? Or, more precisely, about how artificial intelligence is going to make everything faster and easier but also destroy all that we hold dear? Yes, I love doing that too. I did it the other night. Good times.

A new era is upon us. The quiet mourning for the death of a world we were barely holding on to by our fingernails anyway.

It's human to be anxious about change. Knowing that all things are passing helps us live better today.

I'm not talking about AI only with other oldsters, by the way, who only recently figured out how to share documents on Zoom and have made peace with the prospect of never talking to their children with a phone against their ear again. The angst is generational. Many of my Gen Z students at New York University's Stern School of Business tell me they are in an angsty love-hate relationship with AI. It does their homework but leaves them wondering if their expensively educated brains are special after all. It plans

their trips to Europe after graduation, but it also is creating an economy that makes their future employers so nervous that job start dates are being delayed. Their professors—myself included—encourage them to be excited about the opportunities AI will bring someday. Except that the time between now and “someday” feels like a yawning chasm of chaos and uncertainty. It reminds them, they confess, of the pandemic all over again. Even if you generally find yourself annoyed with the Zoomers, you have to admit they are on to something here.

Because my business-school class is about helping students plan their life journeys, I have found myself in an unlikely corner lately, offering advice on how to process “AI grief,” for lack of a better term. I've tried it out on my own boomer friends and colleagues—as I did at that buzzy bar. On these occasions, too, the conversation brought a bit of relief. If you're grappling with your own small or large dose of “farewell to all that,” some thoughts:

One of the hardest things we ever learn in life is that forever is a long time. With AI, that lesson is upon us. After my husband, Jack, died, another widow I knew called to express her condolences. Six months had passed, and my grief was still very raw. I asked her when it would get easier. She laughed, sadly: “You think the first year is bad? The second year is when you realize how long forever is.”

So much in our life passes, but we



GETTY IMAGES/ISTOCKPHOTO

can make sense of it, or even replace it with something better. We lose a job; we get another. We lose our hair and find it never really mattered. But when something, or someone, is gone permanently, the grief is dizzying on another level. It feels too big, unprocessable.

That, I say, is the weird feeling AI is stirring in your chest. There is no antidote. What saves you—and will eventually tamp down your anxiety—is that knowing that forever stealing things from us without end makes us better at living and loving in the present. That's a hard-won gift, but a gift nonetheless.

The second piece of advice I offer is more context than advice. I remind the mourners that evolutionary psychologists have been telling us for years that we don't live in the world our brains were designed for.

We've adapted, but research, originally presented by Oxford University's Robin Dunbar suggests that people function optimally in communities of around 60 to 100—roughly the size, not surprisingly, of the first tribes on the African plains. That's about all the input and output we can take, in terms of talking, listening, gossiping, nurturing, managing, predicting and leading. Think for a moment about the number of people in your life who pour images, ideas, requests, demands, feelings and noise into your head daily. It's not 60; it's probably closer to a multiple of 100.

Where does this context leave us? Maybe simply with a sense of relief that our AI discomfort is, well, human. Technology will change the world in ways that take us even further away from our brain's design.

What Ukraine Needs to Do in Its 2023 Counteroffensive

By Mark T. Kimmitt

At Ramstein Air Base last week, the U.S. and its allies met and pledged more equipment and training for Ukraine. With the 2023 counteroffensive months off, analysts are discussing tactics, logistics, troop numbers and the effect of the “Teixeira leak” on the critical element of surprise. They talked about timing of tank deployments and possible kick-off dates but not the most important question: What would a successful counteroffensive achieve?

President Volodymyr Zelensky's ultimate goals—removing Russian forces from Ukraine and restoring sovereignty over the whole of Ukraine, including Crimea—are unlikely to be achieved in 2023. Instead, military operations in coming months should be seen as the first in a series of campaigns to reach Mr. Zelensky's objectives.

The Allied invasion of Europe in World War II required a series of campaigns to bring Germany to its

knees. The Normandy landing was essential, but follow-on campaigns that broke through the German encirclement in France, the key 1945 battles known as the “race to the Rhine,” and the fall of Berlin were needed to end the war. The counteroffensive in Ukraine should be seen in a similar manner—not as the final battle but an intermediate campaign in that direction.

In the 2023 counteroffensive, success can be measured by meeting three conditions. Russian forces must be decisively defeated, key terrain must be seized, and Ukrainians must have the momentum and support for follow-on campaigns.

While Vladimir Putin's forces must be dealt a significant defeat, the purpose isn't merely to reduce the size and strength of his military. The counteroffensive must also send a message to the people of Russia, its military, elites and Mr. Putin's inner circle, that the war is unwinnable. Russia can bring to bear more forces and resources, but mass conscription

and continued sanctions resulting from a significant military defeat will diminish public support.

Second, critical cities and ground must be retaken—that the military labels “seizing key terrain.” In contrast to Bakhmut, where no critical advantage to either side will be achieved by hoisting a flag over city

It won't take Crimea, but it needs to defeat Russian forces, seize key areas and seize momentum.

land bridge from Crimea will be cut, Ukraine will again have access to the Azov Sea, and its troops, rockets and artillery will be able to attack targets south into Crimea and north into the Russian logistics lines. Further, this terrain is ideal for initiating more offensives.

A successful campaign will also reinvigorate allied support. Despite public pronouncements of “as long as it takes,” enthusiasm for the war is waning. The West wants to see a return on its investment and lately there has been little. That is due largely to months of perceived stalemate, an impasse at Bakhmut, and scant progress on the ground. The carnage on the front lines from artillery bombardments, the attacks on infrastructure and the lack of momentum may seed doubt about the utility of the war. But as the September 2022 offensives showed, a successful counteroffensive can generate enthusiasm, support and patience.

Well into the second year of fight-

ing, the front lines look little different from the preinvasion lines set by the 2015 Minsk II Agreement. Time is on the side of the patient, and Mr. Putin shows no signs of haste. The allies recognize that a counteroffensive is necessary, but its objectives should be carefully considered.

This campaign alone won't end the war, but at a minimum it must inflict a massive defeat on Russian forces, in full view of the Russian people. It must take key terrain necessary for prosecuting follow-on campaigns. It must show the allies that Ukraine is a winnable war that won't drag on for years, and one worth continued investment to achieve Mr. Zelensky's aims. The coming counteroffensive will be a bloody, brutal series of battles, likely the largest to date, but its success will change the course of the war.

Mr. Kimmitt, a retired U.S. Army brigadier general, served as assistant secretary of state for political-military affairs, 2008-09.

Team Biden Looks for an Excuse to Impose Drug Price Controls

By Merrill Matthews

The Biden administration hopes to use a more than 40-year-old law to confiscate patents and impose price controls on prescription drugs. These are the government's current target, but the administration's actions could affect virtually any discovery developed at a university, medical school or research institution that receives even minimal government financial support.

The bipartisan Bayh-Dole Act, also known as the Patent and Trademark Act Amendments of 1980, allows universities, medical schools and research institutions to use federal funds for research to develop innovative technology and products. These institutions can then file patent applications, license their discoveries, and try to generate revenue that can help cover the costs of university programs. Some of this revenue usually goes to the inventors, acknowledging a principle that Abraham Lincoln aptly articulated: The patent system adds “the fuel of interest to the fire of genius.”

UCLA's Dr. Dennis Salmon, who has received numerous National Institutes of Health research grants, helped discover a gene common in a very aggressive form of breast cancer in the 1980s. That initial re-

search led to the development of Genentech's anticancer drug Herceptin.

Creating something of value in a university lab isn't the same as manufacturing a product, pricing it and marketing it to the public. That's why Bayh-Dole allows universities and research institutions to license their innovations to businesses that have the capital, factories and marketing expertise to bring an innovation to market.

A new working group has been tasked with redefining the Bayh-Dole Act's march-in rights.

One of the primary beneficiaries of Bayh-Dole is the prescription-drug industry. Researchers at universities and medical schools are working constantly to find the next life-saving drug. Drug companies often pay universities or other public research institutions to license a discovery and bring promising research to the public. These companies invest hundreds of millions and even billions of dollars for the costly clinical trials required to bring a new drug to market. This system has worked remarkably well for 43 years.

But the Biden administration is grumbling over the price of a few prescription drugs and is looking to use a provision in Bayh-Dole known as march-in rights to impose price controls on drugs developed through these partnerships.

Under Bayh-Dole, march-in rights allow the government to step in and license a patent without the holder's approval if there hasn't been a good-faith effort to bring an important innovation or discovery to market. These rights are meant to ensure commercialization of a product, not set its price.

Concerned groups have petitioned the NIH several times to use march-in rights to lower the price of prescription drugs. In 2004 petitioners urged the NIH to use march-in rights for Norvir, an HIV treatment, and Xalatan, for glaucoma, and in both 2016 and 2023 for Xtandi, a prostate-cancer drug. NIH denied all of those requests because the drugs were in the market, just not at the lower price available in some other countries.

Recognizing the current roadblock to imposing price controls, Health and Human Services secre-

tary Xavier Becerra and the Commerce Department on March 21 announced the formation of a Bayh-Dole working group to “develop a framework for the implementation of the march-in provision” in which several factors, including price, can be considered when triggering march-in rights.

Put simply, the Biden administration is searching for some justification to claim that the law allows the government to impose price controls on certain prescription drugs. But prescription-drug companies aren't the only beneficiaries of federally funded research. Any industry that has relied on government-backed research could become a future target.

In 2020, 10 federal agencies provided more than \$40 billion in federal funds for research at universities and related institutions. HHS was the leader at \$23 billion, followed by the National Science Foundation, the Energy and Defense Departments, the National Aeronautics and Space Administration and the U.S. Department of Agriculture. If Mr. Becerra's effort to expand Bayh-Dole's march-in provision is successful, accepting money from these or

other federal agencies could put a researcher's patent at risk.

A professor at the University of Nevada, Reno, was awarded a \$1.55 million NSF grant in 2021 to conduct research on drought tolerance and water-use efficiency in plants. If new patented seeds were to emerge from his research, they might be subject to march-in rights.

And in January, the Energy Department announced it would provide \$125 million “for basic research on rechargeable batteries.” That funding may lead to patentable discoveries. But if Mr. Becerra gets his way, the government could march in if it doesn't like the final price of a product developed under the patent.

If the Biden administration can use march-in rights to impose price controls on prescription drugs, it or a future administration could do so for any innovation that benefited from federal funding. It is vital to the future of American innovation that march-in orders not be abused for political purposes.

Mr. Matthews is a resident scholar with the Institute for Policy Innovation in Dallas.

I'm Revisiting the Books of My Youth

By Danny Heitman

Tidying up recently, I took from the shelf my copy of “The Norton Anthology of American Literature” and mended its loose binding, brittle with age after more than four decades. As I reglued the spine and bandaged it with tape, I smiled at the thought that I was lavishing so much care on a volume that, when I'd first used it as a textbook in 1982, had left me cold.

As an avid reader since early childhood who aimed to spend his life with words, I seemed a good fit for the survey class in American lit I took as a college freshman. But I wanted to be a newspaperman, and the musings of Henry David Thoreau, Ralph Waldo Emerson and Emily Dickinson struck me as far removed from real life. I dutifully

plowed through the assigned readings and churned out the term papers, relieved at the end of the semester when I could put the rarified writings of a distant era behind me. I kept the book as an afterthought.

Once I graduated, real life unfolded. Along the way, to my surprise, I discovered that those revered writers from long ago could be wise counsel in navigating life's turns. As the obligations of marriage and parenthood kept me home more often, I reread passages from Thoreau's “Walden” for instruction in how to savor small moments outside my doorstep.

In the wake of family deaths, I found Emerson's quiet resolve after his own losses an inspiration. Dickinson, whose poems remained open to joy as the country careened to-

ward the Civil War, offers me a model in seeking serenity amid social division.

I'm a much better reader of the classics today than I ever could have been at 18. “The trouble with education,” Margaret Ayer Barnes observed in 1930, “is that we always read everything when we're too young to know what it means. And the trouble with life is that we're always too busy to reread it later.”

Her remark rings true, and with our kids now grown and our nest mostly empty, I'm trying to make more time to reconnect with authors I met in my youth. My old Norton, worn by the years but still intact, seems destined to see me through.

Mr. Heitman, a columnist for the Baton Rouge Advocate, is editor of Phi Kappa Phi's Forum magazine.

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Boeing Maintains 2023 Outlook

Plane maker reports 28% jump in first-quarter revenue, beats analysts' estimates

By Andrew Tangel

Boeing Co. said a new production problem expected to delay deliveries of its 737 jets to airlines this summer won't disrupt the plane maker's overall financial outlook for the year.

The Arlington, Va., aerospace company said Wednesday revenue rose 28% to \$17.9 billion in the first quarter from the same period the previous year, beating analysts' estimates. Boeing said it delivered 130 commercial aircraft in the three months ended March 31 as demand for new airliners remained robust.

Despite the emergence this month of a supplier's 737 manufacturing slip-up, the company said Wednesday it plans to increase production of the narrow-body jets to 38 a month later this year, up from the current rate of 31.

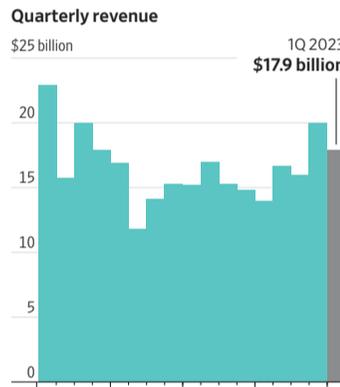
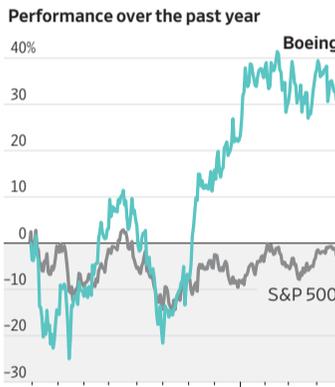
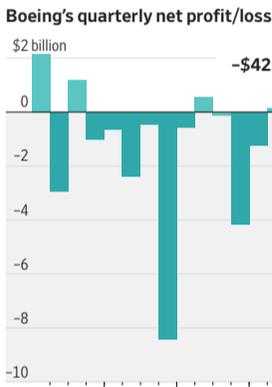
Boeing's shares rose 0.4% Wednesday, while broader U.S. stock indexes were mixed.

Boeing has said the new manufacturing problem, related to certain fittings at the rear of the planes' fuselage, will delay a number of deliveries of 737s in coming months. Airline and airplane-leasing customers tend to pay most of planes' purchase price at delivery.

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Boeing plans to increase production of the narrow-body 737 jets to 38 a month later this year, up from the current rate of 31.



Sources: S&P Capital IQ, the company (profit/loss, revenue); FactSet (performance)

Meta Posts Rebound In Sales, Led by Ad Gains

By Salvador Rodriguez

Facebook parent Meta Platforms Inc. on Wednesday reported its first increase in sales in nearly a year due to continued improvements in its advertising business, as the company continues to pare back spending in what Chief Executive Mark Zuckerberg has called a "year of efficiency."

Mr. Zuckerberg attributed some of these gains to Reels, the company's short-form video product. Mr. Zuckerberg said that Reels is increasing overall app engagement and that the company believes it is gaining share in the short-form video market.

"When we started this work last year, our business wasn't performing as well as I wanted. But now we're increasingly doing this work from a position of strength," Mr. Zuckerberg said in a call with analysts.

The company reported revenue of \$28.6 billion, up 3% from a year prior and ahead of expectations of nearly \$27.7 billion, according to analysts surveyed by FactSet. That snapped a streak of three quarters in which Meta's revenue had retreated from the year prior, the only time that has occurred since the company went public in 2012. Shares surged by more than 10% in off-hours trading, as the company also forecast that second-quarter revenue could reach as high as \$32 billion.

A tough economic climate, an increasing number of regulations limiting personalized ads and the fallout from Apple Inc.'s ad-tracking changes in 2021 have weighed on the digital-ad market. Meta has faced growing competition from TikTok, which in February reached 150 million monthly users.

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First Republic's Problem Has No Easy Fix

First Republic Bank is running up against a grim reality in its fight for survival: There are seemingly no good options.

By Ben Eisen, Andrew Ackerman and Corrie Driebusch

Any solution would likely require assistance from regulators, the government or other lenders. But the darkening economic outlook, bad lending decisions and limits on Washington policy makers pose hurdles for any intervention.

The stakes are high, in part because what they do with First Republic could create a template for how they deal with other troubled banks. The regulators and big banks want to stop the crisis from spreading and avoid having to play whack-a-mole with future problems.

First Republic disclosed Monday that it had lost about \$100 billion in deposits in the first quarter. That prompted a group of 11 big banks to deposit \$30 billion with the bank last month in hopes of stabilizing it. That worked for a short period. But it didn't solve the bigger issues: First Republic specialized in making huge mortgages, often at low rates, to wealthy borrowers, and that business model no longer works. Now the bank is sitting on a pile of loans that are mispriced for the current interest-rate environment.

First Republic has recently floated a new rescue plan to the 11 banks, according to people familiar with the matter. Its proposals included a plan whereby the other banks would buy First Republic's loans or securities, or both, at prices above market value.

A spokesman for First Republic declined to comment. The bank on Monday said it had retained 97% of client relationships from the start of the first quarter. The bank's earnings showed just how dire the situation is. The stock fell nearly 20% on Monday.

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ANDREW KELLY/REUTERS

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Drug-Trial Failures Press Merck

By Jared S. Hopkins

The gold rush from pioneering cancer immunotherapy Keytruda is about to run out for Merck & Co.

Keytruda, one of the world's top-selling drugs, powered its maker for the past decade. The therapy's annual sales neared \$21 billion last year, about a third of Merck's revenue. Yet a drop in sales looms after Keytruda's main patent expires in 2028.

To extend sales further, Merck has been seeking to combine Keytruda with other drugs, which could get new patents if proven to work.

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Stellantis to Offer Buyouts to Hourly, Salaried Workers

By Ryan Felton and Nora Eckert

Jeep maker Stellantis NV plans to offer buyout packages to both white-collared and hourly workers as it trims costs in some areas to fund its transition to electric vehicles, the company confirmed Wednesday. Stellantis, which also owns Chrysler, Dodge and Ram, said it would offer voluntary separation packages to certain salaried employees with at least 15 years of experience, a company spokeswoman said.

An email sent Wednesday to employees from Mark Stewart, the company's North American chief operating officer, cited the need to control costs as Stellantis invests heavily in electric vehicles. "The competition is fierce, and the cost of electrification cannot be passed on to the customer," Mr. Stewart wrote in the message.

The company is looking to reduce the hourly workforce by approximately 3,500 employees, according to a letter posted on Facebook by UAW Local 1264, which represents a Stellantis stamping plant in suburban Detroit. Factory workers with seniority could receive \$50,000 to leave their jobs, while employees who have been with the company for at least one year would receive a lump-sum payment, the letter said.

The buyouts come as Stellantis, along with General Motors Co. and Ford Motor Co., prepare to start labor talks this summer with the United Auto Workers for new four-year labor agreements. Analysts expect the negotiations to be especially tense and have said the likelihood of a strike when the current contract expires in September is high.

In a statement Wednesday, newly elected UAW President Shawn Fain criticized Stellantis's efforts to reduce its workforce, calling it a slap in the face to union members. "Politicians and taxpayers are bank-

rolling the electric-vehicle transition, and this is the thanks the working class gets," he said.

The buyout offers will be available from May 6 through June 19, with workers tentatively slated to depart the company between June 30 and Dec. 31, according to the letter dated Monday and signed by Doug McIntosh, president of UAW Local 1264.

A Stellantis spokeswoman and UAW spokesman declined to comment on the union local's letter.

The move follows a string of recent belt-tightening measures by the Netherlands-based global auto maker, which employs around 40,500 UAW-represented workers.

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The move follows a string of recent belt-tightening measures by the Netherlands-based auto maker.

Crypto Firms Shift to Safety, Buy Treasuries

By Vicky Ge Huang

Cryptocurrency firms are leaning on traditional financial products to attract customers to the flagging market.

More decentralized finance companies have bought up Treasuries to sweeten yields on their blockchain-based financial services.

Decentralized finance, known as DeFi, allows users to borrow, lend, earn interest and trade digital assets without a human intermediary. While upstart DeFi projects once promised investors double-digit or even triple-digit annualized returns at the peak of the bull market in 2021, yields offered by these peer-to-peer crypto platforms plunged after central bank rate increases dampened investor enthusiasm for speculative assets.

"The high-yield DeFi era is over," said Sidney Powell, chief executive of decentralized lender Maple Finance.

As of Tuesday, one of the biggest DeFi platforms, Aave, was offering a 30-day deposit rate of only around 2% for the two largest stablecoins, cryptocurrencies pegged to the dollar.

Maple Finance is among a host of crypto firms seizing on the higher yields and relative safety offered by U.S. government bonds. Last week, the company launched a product that will earn interest equivalent to a one-month Treasury bill minus a fee on deposits—offering a yield of about 3.4%. This is how the product works: non-U.S. accredited investors can deposit USD Coin into the "cash management pool" and receive tokens that represent their ownership in exchange. The pool then issues a loan to an entity managed by crypto hedge fund Room40 Capital, which will invest customer deposits in one-month Treasury bills.

Proponents of these new products say they appeal to big crypto investors who want to keep stablecoins on hand

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U.S. Treasury yields



Source: Tullett Prebon

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BUSINESS & FINANCE

Kaiser Permanente Adds Northeast System

By ANNA WILDE MATHEWS

Kaiser Permanente, a pioneering integrated health system based on the West Coast, has agreed to acquire a Pennsylvania-based hospital operator to create a new national player in the rapidly consolidating healthcare market.

The combination of Kaiser and Geisinger, which must be reviewed by federal and state agencies, would have more than \$100 billion in revenue.

The two systems, both nonprofits that include health insurers as well as hospitals, announced the deal on Wednesday. Under the terms, Geisinger would operate independently under a new subsidiary of Kaiser's hospital unit after the deal closes, which is expected early next year.

The subsidiary, called Risant Health, aims to acquire four or five more hospital systems and get to total revenue of \$30 billion to \$35 billion over the next five years, the systems said. Geisinger Chief Executive Jaewon Ryu would lead Risant.

"Kaiser Permanente, through Risant, is really stepping out, putting a stake in the ground, and saying we're going to partner with these leading health systems," Kaiser CEO Greg Adams said.

Both systems helped model the integration of health insurance, hospital ownership and other operations.

The biggest healthcare companies in the U.S., including UnitedHealth Group Inc. and CVS Health Corp., have been moving in that direction, unveiling a growing roster of deals to pull together doctors, clinics and other operations with health-insurance units.

These conglomerates say they aim to implement new payment models that are supposed to bolster quality and reduce costs.

"Kaiser knows how to bring those pieces together and has been doing that for its entire history," said Chas Roades, co-president of Gist Healthcare, a consulting firm owned by industry advisers Kaufman Hall.

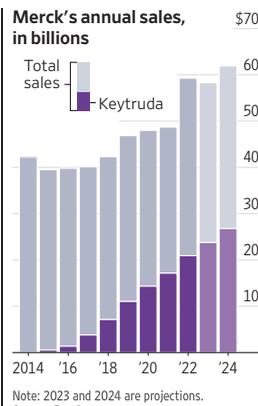
Mr. Roades said he expects a number of hospital systems would probably be eager to join Risant, because of Kaiser's resources and expertise in managing patients' health and the cost of care.

"This puts them in the conversation with UnitedHealth and CVS Health,"

Geisinger, based in Danville, Pa., reported about \$6.9 billion in revenue last year. It counts 10 hospitals and about 600,000 health-plan enrollees and employs more than 1,700 doctors.

The transaction between the two nonprofits isn't structured as a traditional purchase, but Kaiser is expected to provide about \$5 billion in funding to Risant, the systems said.

Geisinger and other acquired hospitals won't be wrapped into Kaiser's own core operations. Instead, they will retain their local brands and models, including working with insurers other than Kaiser's health plan.



Drug-Trial Failures Press Merck

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Most haven't, however, intensifying pressure on the company to find other sources of revenue and contributing to a risky and costly deal-making spree.

Keytruda failed as a combination therapy in 21 late-stage studies spanning nine partner drug technologies, according to SVB Securities LLC. Researchers didn't advance at least 66 combination studies after early or midstage trials. "The track record has been horrible," said Daina Graybosch, an SVB Securities pharmaceutical analyst.

Some Keytruda combinations panned out. Doctors use the drug with chemotherapy for about a half-dozen cancers, and U.S. health regulators recently cleared a pairing with a targeted treatment for advanced bladder-cancer patients. This month, researchers found Keytruda and a cancer vaccine from Moderna Inc. helped prevent relapses in high-risk melanoma patients in a midstage study.

Merck is testing a tweaked version of Keytruda, which is infused intravenously, so it can be injected under the skin.

40%
Possible sales fall in 2 years amid off-brand versions of Keytruda

And the company is studying the drug in new tumors and earlier stages of various cancers. "We've learned a lot and certainly that gives us a leg up on our future development programs for our next generation of anticancer drugs, but it's still always going to be a game of chance," said Eliav Barr, Merck's chief medical officer.

The approved combinations don't promise to generate the revenue Merck needs to offset a roughly 40% drop in sales that it could lose within two years if rivals launch off-brand versions of Keytruda, analysts said.

Merck has been making deals and developing new heart, immune-disease and other cancer drugs that will reduce its dependence on Keytruda and could add billions of dollars in sales, the company said.

Immunotherapies such as Keytruda belong to a class that lifts a natural brake on the immune system, allowing it to attack cancer cells. Bristol-Myers Squibb Corp. secured the industry's first approval of the class in 2011. Keytruda, which was cleared three years later to treat melanoma, became the go-to of the class in large part because it performed better than Bristol's rival in lung-cancer study subjects. The drug earned 35 approvals across 16 cancers.

Companies including Merck, academics and others are now conducting 1,935 clinical trials involving the drug, more than any other approved immunotherapy treatment, according to the Cancer Research Institute.

Merck scientists and other researchers have been especially interested in combining Keytruda with other agents because the drug alone doesn't help a sizable percentage of patients. Combinations would help extend sales because insurers would agree to pay for Keytruda in addition to its partner drug. Merck could package the combination under a new brand protected by new patents.

—Doug Cameron contributed to this article.

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No Easy Fix at First Republic

Continued from page B1

50% on Tuesday and shed 30% Wednesday, closing at \$5.69. Essentially, the stock market is saying that First Republic is nearly worthless in its current state.

"It's hard for me to see a good outcome for the equity holders at this point," said David Smith, a U.S. banks analyst at Autonomous Research.

The bank has lost 95% of its value since the banking crisis began in March, far worse than even other banks viewed as potentially problematic.

The bulk of First Republic's balance sheet consists of loans, amounting to about \$173 billion at the end of March. And a huge portion of these, about \$100 billion, are single-family mortgages, many of them made when interest rates were far lower than they are today.

The upshot: As of Dec. 31, First Republic's loan book had about \$22 billion in unrealized losses. The unrealized losses make it difficult to find a buyer for the bank.

The deposit run has also forced First Republic to rely on other, more expensive funding. That makes it hard to generate interest income, and at some point it might not be able to.

Part of First Republic's pitch to the other banks: The big banks would have to pay up anyway if First Republic failed. If the Federal Deposit Insurance Corp. guaranteed all depositors, the other banks would be hit with a special assessment for a federal insurance fund. If the FDIC didn't guarantee depositors, the banks would take a haircut on uninsured deposits.

The banks could get warrants in return for buying First Republic's loans or securities, and those could potentially be profitable in the future—as long as First Republic survives. But purchasing some or all of the loans works only if buyers are willing to take on losses, essentially subsidizing First Republic.

Another idea was that the big banks could convert some of their \$30 billion in deposits into equity, according to people familiar with the matter. But that would simply shift the losses, and potential future ones, onto those banks.

The banks might also believe that they are more likely to get their money back if they keep it in deposits, since Treasury Secretary Janet Yellen has signaled that the federal government could protect customers with uninsured deposits if regulators see the risk of a run on the banking system.

—Laura Cooper and Miriam Gottfried contributed to this article.

Bristol-Myers's Caforio to Retire As Drugmaker's Chief Executive

By JARED S. HOPKINS AND LAURA COOPER

Bristol-Myers Squibb Co. Chief Executive Giovanni Caforio is planning to retire, the company said Wednesday.

Chief Commercialization Officer Christopher Boerner will take the helm when Dr. Caforio leaves his position Nov. 1, the company said. Dr. Caforio will remain executive chairman of the drugmaker.

Dr. Caforio has led the New York-based drugmaker since 2015, when he succeeded Lamberto Andreotti. Dr. Caforio also serves as chairman of the board.

During his time at the helm, Bristol cemented its position as a leading seller of cancer treatments. Among its moves was a \$74 billion purchase in

2019 of cancer specialist Celgene.

A trained physician, Dr. Caforio joined the company in 2000 as general manager of its Italy business.

He then rose through Bristol's ranks, including playing an important role in the company's pioneering work bringing to market drugs called immunotherapies

Yet Dr. Caforio also was chief executive when the company's second immunotherapy Opdivo lost its No. 1 market position to a Merck & Co. rival called Keytruda.

Keytruda worked in a study testing the drug in people newly diagnosed with lung cancer, while Opdivo didn't significantly work better than chemotherapy.

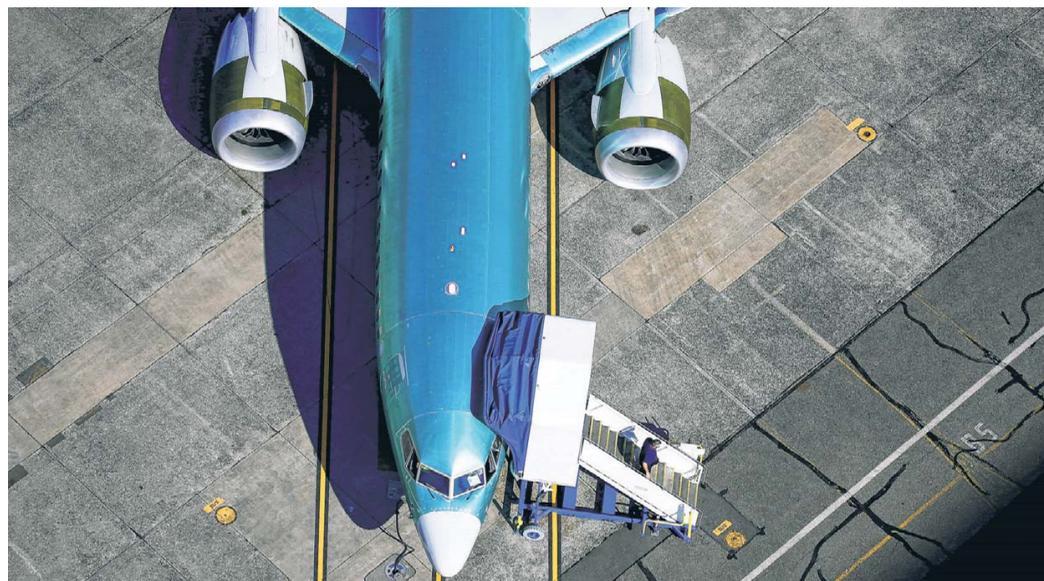
"My 23 years at Bristol-My-



Giovanni Caforio

ers Squibb have been the most fulfilling of my professional career," Dr. Caforio said.

Dr. Boerner worked at McKinsey & Co. and then Seattle Genetics and Genentech before joining Bristol in 2015, the company said. As chief



Boeing has said a new manufacturing problem, related to certain fittings at the rear of the 737 fuselage, will delay a number of deliveries of the planes in coming months.

Boeing Maintains '23 Outlook

Continued from page B1

"We remain confident in the operational and financial goals we set for this year, as well as for the longer term," Chief Executive David Calhoun said in a message to employees Wednesday.

Mr. Calhoun said the "gnarly defect" on the 737 would be difficult to catch by staff at Boeing or its supplier and that a sealant made it impossible to notice any cracks. The defect was the result of an

unapproved technique that used too much force to install the fittings, people familiar with the matter said. Mr. Calhoun said such production missteps overall were becoming more manageable.

For the entire year, Boeing has said it expects to report \$3 billion to \$5 billion in free cash flow, a key metric for investors that reflects money left over after expenses and investment spending. The company has said it plans to deliver 400-450 of its 737s for the year.

Mr. Calhoun said Boeing continues to focus on stabilizing its operations while restoring the company's financial strength. He has said the company maintains its long-term goal of achieving \$10 billion in free cash flow by 2025 or 2026. The company reported \$2.3 bil-

lion in free cash flow for 2022.

The effort is part of a longer-term plan to return to its level of profitability before two 737 MAX crashes in 2018 and 2019. The accidents claimed 346 lives, led to a worldwide grounding of the jet and cost Boeing billions of dollars.

Mr. Calhoun said the company's financial outlook doesn't assume China resuming taking deliveries of Boeing aircraft.

Deliveries to the country have largely been halted amid heightened U.S. trade tensions in recent years.

Mr. Calhoun said all of China's 737 MAX operators have returned the jets to the air, with 45 of the 95 in-country planes back in service since the now-lifted grounding of the jet in recent months.

Boeing said it is producing

three 787 Dreamliners a month, and it plans to produce five a month later this year. The wide-body jet, which is popular among airlines for long-haul international travel, has had several setbacks in recent years. A regulatory-documentation issue briefly halted deliveries earlier this year.

For the first quarter, Boeing said its loss narrowed to \$425 million, or 69 cents a share, from \$1.2 billion, or \$2.06 a share, a year ago.

Earnings were dragged down by a \$245 million charge related to its military refueling tanker. The company's adjusted loss of \$1.27 per share missed analysts' expectations of a \$1.07 loss per share, according to FactSet.

—Doug Cameron contributed to this article.

BUSINESS NEWS

Hip-Hop Artist Found Guilty in Influence Scheme

By C. RYAN BARBER
AND ARUNA VISWANATHA

WASHINGTON—Pras Michel, who rose to fame in the 1990s as a member of the Fugees hip-hop trio, was found guilty Wednesday of serving as the linchpin of a multimillion-dollar foreign-influence scheme that spanned two presidencies and combined celebrity with political intrigue.

After a monthlong trial, a jury in Washington convicted Mr. Michel on charges he improperly injected millions of dollars in donations to then-President Barack Obama's re-

and not registering his lobbying work on behalf of a foreign national.

Through weeks of court proceedings, federal prosecutors alleged that Mr. Low sent more than \$20 million to Mr. Michel in 2012, some of which the former rapper directed to straw donors to support Mr. Obama's re-election bid while concealing the true source of the funds.

"Mr. Michel is at the center of the conspiracy, he's the core, he's the linchpin," prosecutor Sean Mulryne told the jury in closing arguments.

As part of that portion of their case, prosecutors called the actor Leonardo DiCaprio to testify about his business relationship with Mr. Low, who helped fund "The Wolf of Wall Street," a 2013 film starring Mr. DiCaprio that Hollywood studios saw as a risky project.

On the witness stand, Mr. DiCaprio recounted a conversation in which he said Mr. Low told him he planned to make significant political contributions to the Democratic Party during the 2012 election. Mr. DiCaprio, the Academy Award-winning star of blockbusters such as "The Revenant" and "Titanic," recalled Mr. Low expressing plans to contribute between \$20 million and \$30 million.

Testifying in his own defense, Mr. Michel said he considered the funds he received from Mr. Low to be "free money." Mr. Michel said he accepted the money for having helped Mr. Low secure a photograph with Mr. Obama.

His lawyer, David Kenner, argued that Mr. Michel didn't knowingly break any laws, describing his client as a "proud American."

"Rich people spend crazy money on crazy things," he said.

At Bed Bath & Beyond, Era of Signature Coupons Comes to an End

Many Bed Bath & Beyond Inc. shoppers flocked to the chain's last Manhattan store this week to peruse aisles full of red sales tags. Most came after they heard Bed Bath & Beyond filed for bankruptcy on Sunday.

"This is my happy place," Joanne Antoine, a 40-year-old home health aide from Brooklyn, said Monday. "I wanted to experience the last moments."

Ms. Antoine and other Bed Bath & Beyond loyalists are mourning the end of the retailer best known for stuffing coupons into mailboxes. The retailer said it expects to close its remaining 360 Bed Bath & Beyond and 120 Buybuy Baby locations. It said it stopped accepting coupons on Wednesday, when clearance sales were set to begin. It said it expects to liquidate its inventory and vacate its stores by the end of June.

"I come here when I need things, especially these," Ms. Antoine said, pointing to bath mats at the Manhattan store, in the Chelsea neighborhood, on Monday.

—Alyssa Lukpat



THALIA JUAREZ FOR THE WALL STREET JOURNAL



Pras Michel

election campaign in 2012 and, years later, illegally lobbied the Trump administration.

The Hollywood-meets-Washington trial featured a cast of characters from the worlds of business, entertainment and politics, with charges rooted in one of the largest financial scandals in history. It cast a spotlight on Mr. Michel's relationship with Malaysian businessman Jho Low, the alleged mastermind behind a scheme to steal more than \$4.5 billion from a Malaysian development fund, IMDB.

Mr. Michel was found guilty on all 10 counts he faced, including conspiracy to defraud the U.S., witness tampering

Tyson to Cut 10% of Corporate Jobs

By PATRICK THOMAS

Tyson Foods Inc., the largest U.S. meat supplier by sales, is eliminating 15% of its senior leadership positions and 10% of corporate roles, according to a memo sent to employees.

"This is not an easy day," Tyson Chief Executive Donnie King said Wednesday in a note to employees, which was reviewed by The Wall Street Journal. Discussions with the majority of affected employees will take place this week, Mr. King said.

Arkansas-based Tyson employs about 142,000 people globally, according to its latest annual securities filing. The meat giant has about 124,000 U.S. workers, including roughly 118,000 employed at noncorporate sites, such as production facilities, warehouses, truck shops, hatcheries and feed mills.

A Tyson spokesman said the

company is constantly evaluating how it executes its strategy. The changes to its ranks will allow Tyson to operate with more speed, collaboration and agility, he said.

Tyson's planned staff reductions were earlier reported by Reuters.

Tyson, which produces about one out of every 5 pounds of chicken, beef and pork sold in the U.S., has been under pressure as it grapples with higher costs across its business.

"We will drive efficiency by focusing on fewer initiatives with greater intensity and removing duplication of work," Mr. King said in his note to employees.

Last month, the company said it plans to shut down two of its poultry plants and lay off nearly 1,700 workers as part of its efforts to improve efficiency in its chicken business.

In February, Tyson posted

its biggest percentage drop in quarterly profit in more than a decade. Tyson's stock is down nearly 36% over the past 12 months. Shares of Tyson fell about 1% on Wednesday.

The company's chicken business has struggled for years with a variety of issues, includ-

36%

Decline in Tyson Foods' stock price over the past 12 months

accounted for almost 40% of its 2022 annual sales, Tyson is paying more to secure cattle as ranchers across the U.S. shrink the size of their herds in response to persistent drought conditions. Higher cattle costs are pressuring Tyson's beef profit after years of record-level margins during the pandemic.

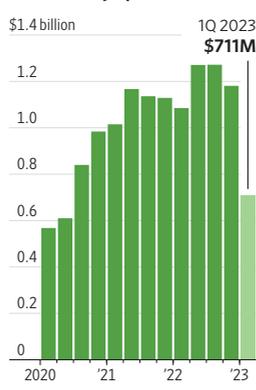
Tyson's layoffs follow a broad shuffling of much of its leadership team over the past several months. The company has named new leaders for its international, prepared foods and chicken divisions, as well as for its beef and pork unit.

Hundreds of Tyson's corporate employees also are leaving the company after it made the decision last year to close its corporate offices in South Dakota and Illinois and moved those functions to northwest Arkansas. The offices housed employees of its beef and pork and prepared foods divisions.



The charge helped drive income from railway operations down 34%.

Norfolk Southern's income from railway operations



Source: the company

Norfolk Southern Records \$387 Million Derailment Hit

By WILL FEUER

Norfolk Southern Corp. said the train derailment that spilled toxic chemicals in a small Ohio town earlier this year could cost the company \$387 million, as the complex cleanup and investigation into the accident continues.

The Atlanta-based railroad operator reported the charge in its first-quarter financial report and said it is largely tied to anticipated costs of the environmental cleanup and legal proceedings. The charge—roughly 12% of the company's profits in 2022—doesn't reflect money that Norfolk Southern could potentially recover through its insurance policies, the company said Wednesday.

"We are going to do whatever it takes to make it right for East Palestine and the surrounding areas," Chief Executive Alan Shaw said, referring to the Ohio town where the train derailed Feb. 3.

Mr. Shaw told analysts on a conference call that the company has 300 people, between employees and contractors, on the ground in East Palestine seven days a week, focused on the environmental cleanup.

Chief Financial Officer Mark George said the company expected to have to pay some oversight costs related to the government's response to the derailment. He said there are

other costs the company expects to pay but aren't included in its initial cost assessment.

Norfolk Southern has so far spent about \$55 million, about half of which has gone toward community reimbursement, he said. The company has said it would provide support for a long-term medical-compensation fund, long-term protection for drinking water and funds for home sellers if their properties lose value from the derailment's impact.

In the derailment, dozens of railcars, including some tankers carrying hazardous materials that caught fire, derailed in East Palestine, just miles from the Ohio-Pennsylvania border.

The accident spawned a complex environmental cleanup and monitoring effort that involves local, state and federal agencies. Millions of gallons of wastewater and tens of thousands of tons of solid waste have been removed from the area and shipped off-site, according to the Environmental Protection Agency.

It also sparked lawsuits against Norfolk Southern from the state of Ohio and Justice Department as well as a number of residents and businesses in East Palestine.

The National Transportation Safety Board is continuing to investigate the derailment and opened a special probe into Norfolk Southern's safety cul-

ture, citing "the number and significance" of recent accidents involving the company. The Federal Railroad Administration also has opened a safety probe into Norfolk Southern. The accident also has spurred broader scrutiny of how railroads operate, and some lawmakers have sought to implement new and strengthen existing safety rules.

Mr. Shaw has pledged to enhance the company's safety practices but also defended its operating record, citing improvements in employee injury rates and other key metrics in recent years. He said the company was analyzing policies on how it assembles trains that move along rail routes.

The accident continues to hamper the company's operations, with only one track in service in East Palestine since March 3, Mr. Shaw said. The company expects to finish work removing contaminated soil and have both tracks in service by early June, he said.

The charge tied to the Ohio derailment helped drive income from railway operations down 34% to \$711 million in the latest quarter from the prior-year period. Stripping out that charge, adjusted earnings came in higher than what was expected by Wall Street analysts, according to FactSet.

Revenue rose 7% to \$3.1 billion, in line with analysts' expectations.

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Security Chiefs Combine Forces

AI can help identify potential physical attacks, says one chief information officer

By JAMES RUNDLE

Cyberattacks are blurring the lines between physical and digital risks, forcing cybersecurity and physical security chiefs to work closely together to combat threats, executives say.

Cyber-physical threats, where an attack on computer systems might cause damage to property or people, or vice versa, have long been a concern for companies in the defense-industrial base, power and other critical-infrastructure sectors.

Now security chiefs across industries are becoming concerned that even a minor technology disruption after a hack could have real-world risks.

At **Schneider Electric SE**, Chief Information Officer Elizabeth Hackenson said she now works closely with the company's chief information security officer and chief security officer, who is responsible for safeguarding facilities against intrusions and damage. The three are peers in the company's hierarchy, she said, regularly sharing threat intelligence and planning for scenarios where a converged incident might occur.

Ms. Hackenson said concerns at Schneider, which specializes in energy management and automation technologies for residential and commercial properties, center on what they could be missing. A physical attack on one of the company's plants or distribution centers could distract attention from a cyberattack if the cyber, IT and security divisions aren't sharing informa-



When Colonial Pipeline Co. was hit by ransomware in May 2020, it shut down tech systems and temporarily stopped transporting fuel.

tion, technology and resources to analyze information.

"The threat actors are always ahead, and they sometimes use newer technologies better than we do, so I feel this new cyber-physical threat is something that we absolutely have to pay more attention to," she said.

Hacks have had material consequences in the past. A cyber-attack against Ukrainian power stations caused blackouts across Kyiv in late 2016, and similar strikes were attempted during the opening phases of Russia's invasion in 2022. Recently, leaks of U.S. intelligence material suggested pro-Russia hackers infiltrated systems within Canadian energy infrastructure operators, giving

them the ability to shut down machinery or cause explosions.

Although cyber-physical tactics have traditionally been considered a tool of nation states, the critical importance of technology to companies across sectors means that even low-level criminal cyberattacks can have pronounced impacts on day-to-day operations.

"If you take a ransomware attack in something like a hospital, and that shuts the hospital down, that caused a physical action from a cyber event," said Marshall Heilman, chief technology officer at Alphabet Inc.'s Mandiant threat-intelligence unit.

Sometimes the actions of a hacked company trigger physical aftermath. When Colonial

Pipeline Co. was hit with ransomware in May 2020, the company decided to shut down tech systems to prevent the malware's spread. In turn, Colonial temporarily stopped transporting fuel, shutting down the largest fuel artery on the U.S. East Coast for six days.

Getting cybersecurity and corporate security on the same page isn't always an easy task. While both functions deal with security in a broad sense, the disciplines involved are different, said Dave Komendat, who was the CSO for aerospace giant Boeing Co. until retiring from the company in October.

Cybersecurity tends to be a technical function, focused on

network defense, while corporate security has been traditionally concerned with personnel and the protection of physical assets, which requires both sides to learn about the other's jobs, Mr. Komendat said. He is now an independent consultant.

Cybersecurity chiefs, too, are finding that industry advances are also forcing them to learn more about protecting physical infrastructure.

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Measure Targets Ticketing Markets

By ANNE STEELE

Senators on Wednesday introduced legislation aimed at improving competition in live ticketing by preventing ticketing companies from locking up venues in long-term exclusive contracts.

The move follows a Senate hearing in January on Ticketmaster's Taylor Swift ticketing fiasco last fall.

The Unlock Ticketing Markets Act, sponsored by Sens. Amy Klobuchar (D., Minn.) and Richard Blumenthal (D., Conn.), would allow the Federal Trade Commission to prevent the use of "excessively long" multiyear exclusive contracts with event venues that the senators say lock out competitors, discourage innovation of new services and increase costs for fans.

The decadeslong industry practice, by which ticketing services pay venues for the exclusive rights to ticket live events that come through their doors, has been in the spotlight as lawmakers and regulators scrutinize competition in the live-events industry.

"Right now, one company is leveraging its power to lock venues into exclusive contracts that last up to 10 years, ensuring there is no room for potential competitors to get their foot in the door," said Ms. Klobuchar, not specifically naming but alluding to **Live Nation Entertainment Inc.**'s Ticketmaster, the largest concert promoter and ticketing service.

Live Nation didn't comment.

Logistics Company Struggles With Fallout After Hack

By KIM S. NASH

When **Expeditors International of Washington Inc.** discovered on a Sunday in February last year that hackers had penetrated its network, the global logistics company shut down most of its operating and accounting systems to protect its data and infrastructure. That, in turn, limited its ability to ship freight, manage customs processing and distribute customers' products. The outage went on for three weeks.

Fourteen months after the incident, Expeditors is still dealing with the fallout, battling longtime customer **iRobot Corp.** in court over the delays and lost business.

Though the \$2.1 million being sought by the Roomba robot vacuum maker is small change for either company, the case reflects the long tail of a cyberattack and the fragility of the global supply chain where a major shipping company's operations can be derailed by hackers.

"The timing of this cyberat-

tack could not have been worse," said Steve Ferreira, chief executive of **Ocean Audit Inc.**, a logistics-auditing company. "I liken this cyberattack to the Ever Given stuck in the Suez Canal," he said, referring to the massive container ship that became wedged across the waterway for a week in 2021 and disrupted global shipping for weeks. After Expeditors' hack, he said, "there were other impacts and delays. Products stopped moving."

Expeditors, which provides logistics services for auto makers, retailers, manufacturers and pharmaceutical companies, hasn't said what kind of hack it experienced.

The company didn't respond to requests for comment.

The episode already has cost Expeditors \$47 million in extra charges for prolonged use of shipping containers at depots and terminals, according to its latest annual report. An additional \$18 million has been spent on technology products and services to in-



Expeditors is battling iRobot in court over delays and lost business.

vestigate and recover from the incident and to cover claims related to shipping problems at the time, the report said.

The Expeditors incident came amid cargo pileups at U.S. ports due to equipment shortages and supply-chain snarls related to the Covid-19 pandemic, said Mr. Ferreira. Plus, companies based at Belgium's Port of Antwerp-Bruges were infected with ransom-

ware at about the time Expeditors disclosed its attack. Weeks before, hackers had hit two fuel-logistics companies in Germany and firms based at ports in the Netherlands.

With costly disruptions rippling through the supply chain, the Federal Maritime Commission voted to exempt Expeditors from having to file required documents about tariffs while it dealt with the in-

cident.

"Recognizing that these cyberattacks are becoming more common and more companies will be impacted, we've tried to be a cooperative regulator," said John DeCrosta, a spokesman for the commission, which oversees international ocean transportation.

Two commissioners urged companies at ports to give Expeditors' customers a break on storage charges as cargo sat in containers, but many continued to issue penalties, Mr. Ferreira said.

It is likely that some of Expeditors' customers demanded reimbursement, as iRobot is doing, he said.

Expeditors said it can't estimate for other potential litigation or claims, adding that it isn't fully insured for cyber incidents because, as with earthquakes and terrorism, "it is not deemed economically feasible or prudent to do so." The cost of cyber insurance is high and climbing.

Failed negotiations with Expeditors in 2022 led iRobot to sue in January, according to

court papers.

The company accused its logistics provider of 15 years of breaching contractual promises to ship products and provide real-time data on inventory. Expeditors denied the allegations in court filings.

iRobot didn't respond to requests for comment. It said in the suit that it sent people to Expeditors warehouses in Washington and Virginia to physically count Roombas and other goods, and load nearly 12,000 pallets of products into 207 rented tractor trailers to get orders to customers. Still, late deliveries meant having to refund retailers \$900,000, iRobot said in the suit. It spent an additional \$23,000 on expedited shipping to get products directly to consumers.

The outage "caused them to go into the Stone Age," said Mr. Ferreira of Ocean Audit. "They were hurt."

The suit is ongoing. A final settlement conference is scheduled for February 2024. Supply chains, meanwhile, remain a ripe target for disruptive cyberattacks.

Carlson in Video Lashes Out At 'Unbelievably Stupid' TV

By STEVEN RUSSOLILLO AND ALYSSA LUKPAT

Former Fox News host Tucker Carlson spoke out Wednesday night, posting a video on Twitter where he criticized the level of debate on television shows and said there are few places where truth is told.

"Where can you still find Americans saying true things? There aren't many places left. But there are some. And that's enough," he said in a two-minute video. "As long as you can hear the words, there is hope."

"See you soon," he said at the conclusion of the video, which was shot in his home studio.

Mr. Carlson declined to comment.

The video marked Mr. Carlson's first public comments since his sudden departure from Fox News on Monday. The network said it was parting ways with him

without giving a reason. The Wall Street Journal reported that the discovery of private messages in which Mr. Carlson showed disregard for management and colleagues was a major factor in that decision.

Mr. Carlson's messages were part of a trove of emails and texts from Fox executives and hosts that came to light as a result of a defamation lawsuit against Fox filed by Dominion Voting Systems.

The voting-machine company accused Fox's news networks of airing false claims by hosts and guests that Dominion helped rig the outcome of the 2020 U.S. presidential election in favor of Joe Biden. Fox News parent **Fox Corp.** last week agreed to pay \$787.5 million to settle the dispute.

Fox Corp. and Wall Street Journal parent News Corp share common ownership.

Mr. Carlson, 53 years old, had been at the conservative

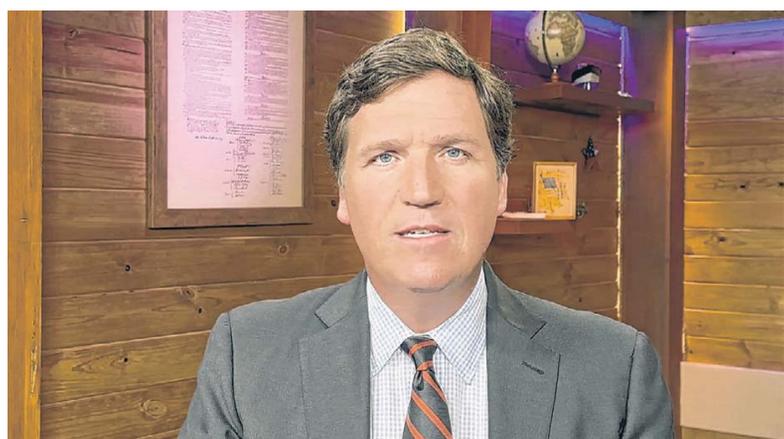
news network for more than a decade. He emerged as an influential political voice during the Trump era and became the highest-rated host in prime-time cable news, averaging 3.2 million viewers in the first quarter of this year, according to Nielsen.

In Wednesday's Twitter video, Mr. Carlson said major topics that will define the country's future—such as war, civil liberties, emerging science, demographic change, corporate power and natural resources—don't get talked about enough.

"Debates like that are not permitted in American media," he said. "Both political parties and their donors have reached consensus on what benefits them, and they actively collude to shut down any conversation about it."

He also criticized the discourse that plays out on television.

"The other thing you notice when you take a little



In a video on Twitter, Tucker Carlson said topics like war and civil liberties aren't talked about enough.

time off is how unbelievably stupid most of the debates you see on television are," he said. "They're completely irrelevant. They mean nothing. In five years, we won't even remember that we had them. Trust me, as someone who has participated."

The "Tucker Carlson Tonight" hourlong show aired weeknights at 8 p.m. until last Friday. Fox News said a rotation of hosts would fill his seat until the network named a permanent anchor.

"Fox & Friends" co-host Brian Kilmeade has hosted the temporarily renamed "Fox News Tonight" so far this week.

During his prime-time tenure at Fox News, Mr. Carlson became a lightning rod for frequently making controversial remarks. That has led many blue-chip brands to back away from advertising during Fox News's prime-time lineup—specifically Mr. Carlson's program—out of fear of being associated with the comments made by the host,

according to ad buyers and former Fox News executives.

Mr. Carlson recently drew criticism from Democrats and Republicans for airing a segment that showed previously unaired footage of the Jan. 6, 2021, attack on the U.S. Capitol. Mr. Carlson said that lawmakers had intentionally overstated the violence. "The footage does not show an insurrection or a riot in progress" in the Capitol, Mr. Carlson said during an early March show.



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BUSINESS NEWS

Meta Posts Rebound In Sales

Continued from page B1
users in the U.S.

The 3% increase is an improvement from the 4.5% drop in revenue that the company posted in the final quarter of 2022. Meta has invested heavily in artificial-intelligence tools to improve its ad-targeting systems.

Those efforts in AI, along with shifting to forms of advertising less dependent on harvesting user data from its platforms, are essential to the company's plans to bounce back. Meta has made progress in overcoming an Apple privacy change that restricted Meta's capacity to gather information about what its users do outside its platforms' walls, The Wall Street Journal reported in January.

Mr. Zuckerberg theorized that generative AI could help marketers more easily create advertisements for Meta's services, power chatbots for businesses on Messenger and WhatsApp and help metaverse users more easily create avatars and virtual worlds.

The company said its operating margin would have been 4 percentage points higher if not for restructuring charges that Meta undertook related to three rounds of layoffs that it



The company's unit that makes Quest virtual-reality headsets recorded a loss of \$4 billion.

announced in March. These layoffs, which will be completed in May, are expected to result in the elimination of 10,000 employees, and they come after Meta laid off 11,000 employees in November.

Meta's family of apps, which includes Facebook, Instagram and WhatsApp, incurred a restructuring charge of \$934 million for the first quarter. Reality Labs, the division tasked with building the hardware and software underpinning Meta's ambitions to build a platform in the metaverse, incurred a

\$210 million charge.

Reality Labs posted revenue of \$339 million for the quarter, a decline of 51% compared with a year prior. The unit, which makes Meta's Quest virtual-reality headsets, posted an operating loss of \$4 billion.

Horizon Worlds, the company's flagship metaverse offering for consumers, fell short of internal performance expectations, according to internal documents from October obtained by the Journal. The company had initially set a goal of reaching 500,000 monthly active users for the

service by the end of 2022, but the tally in October was less than 200,000, the documents showed. The figure rose to just above 200,000 in January, reached following the holiday season when many consumers purchased new Quest headsets and played with them while on break from school and work, the Journal reported.

The company reported a net profit of \$5.7 billion for the first quarter. That represents a roughly 24% decline from the year-ago period, but it is up from \$4.7 billion in the October-to-December quarter.

Holmes's Prison Date Is Delayed

BY MEGHAN BOBROWSKY

Elizabeth Holmes, the disgraced Theranos founder convicted of criminal fraud, doesn't have to report to prison on Thursday.

Ms. Holmes appealed her guilty verdict to the Ninth U.S. Circuit Court of Appeals in December and this week asked it directly if she could stay out of prison while her case makes its way through the appeals process, according to a legal filing on Wednesday.

The request automatically puts Ms. Holmes's reporting date on hold while the court considers her request.

Ms. Holmes previously had asked the judge who oversaw her trial in federal court in San Jose, Calif., if she could remain free pending appeal, but U.S. District Judge Edward Davila earlier this month denied her request.

Judge Davila said in a filing that he didn't think her arguments for a new trial were strong enough to merit a different outcome.

Judge Davila set a reporting date of April 27, 2023, at Ms. Holmes's sentencing hearing in November.

The Ninth Circuit denied a similar request by Ramesh "Sunny" Balwani, Ms. Holmes's No. 2 at the blood-testing startup, who was convicted of defrauding Theranos investors and patients.

Mr. Balwani has started serving his nearly 13-year prison sentence at a low-security facility in San Pedro, Calif.

A lawyer for Ms. Holmes didn't respond to a request to comment.

The U.S. attorney's office for the Northern District of California declined to comment.

Ms. Holmes, the former chief executive officer of the blood-testing startup, is facing more than 11 years in prison for fraud and conspiracy to commit fraud against Theranos investors.

The U.S. District Court of Northern California recommended she serve her time at a federal prison camp in Bryan, Texas, that allows for family visitation.

Ms. Holmes recently gave birth to her second child, after having the first one shortly before the original trial began in 2021.

She started Theranos at 19 years old in 2003 and ran the company for 15 years, seeking to revolutionize the blood-testing industry.

Theranos sought to develop technology that could use just a few drops of blood to conduct a range of tests for health conditions, compared with large needles and vials of blood that are used today. The company, at its peak, was valued by investors at more than \$9 billion.

Developing the technology proved difficult, however.

The company was able to get its finger-prick blood-testing device to work for 12 types of tests but the results were unreliable, according to evidence and trial testimony.

The company resorted to secretly running most of its blood tests on other companies' commercial devices, some of which had been altered by staff to be able to use small amounts of blood.

Ms. Holmes also forged reports provided to some investors, prosecutors said.

She testified in her trial that she made innocent mistakes and thought the company's technology was showing signs of success.

Stellantis To Offer Buyouts

Continued from page B1

resented factory workers, many of them in the Detroit area. Thousands of white-collar employees work at Stellantis offices and other facilities in metro Detroit.

Last fall, Stellantis offered buyouts to salaried employees

in the U.S. The auto maker hasn't said how many white-collar workers accepted the offer. In December, Stellantis said it would close an Illinois assembly plant indefinitely, citing the high costs of electrifying its vehicle lineup. The UAW has been pressing the auto maker to repurpose the Illinois facility to support its future EV plans.

Other car manufacturers have been trimming staff, wary of a potential recession and strains on the consumer that could dent demand, including inflation and higher interest rates, auto executives have said. General Motors said this

month that about 5,000 salaried employees accepted buyouts as part of an effort to cut \$2 billion in costs by the end of 2024. Ford cut about 3,000 workers last summer and signaled earlier this year that more layoffs could be coming. EV startup Rivian Automotive Inc. has shed about 12% of its workforce through layoffs over the last several months.

Stellantis, which was formed through the merger of France's PSA Group and Fiat Chrysler Automobiles NV in January 2021, has said it intends to spend \$35 billion in the coming years on new battery-powered

models and manufacturing capabilities.

The company aims to sell 25 all-electric models in the U.S. by 2030 and will introduce the first of those vehicles later this year.

Carlos Tavares, Stellantis's chief executive, has said the company may need to consider idling additional factories if it can't absorb the costs of making electric vehicles.

"The cost of electrification is going to have an impact on the footprint of business that we're going to have around the world," Mr. Tavares told reporters in February.

"MY EYES AREN'T WHAT THEY USED TO BE"

"I love to read multiple newspapers and books with different views to develop my thinking and perspective; but when I became a senior citizen (70+), eyestrain and fatigue became real problems - common problems related to insufficient light. After reading the ads and investigating online, we tried the lamps and have bought several of the floor and tabletop models. Remarkable - they have provided flexible, effective, comfortable illumination; good color tone; are attractive and blend well with our decor ... They totally resolved our issues with reading and enjoying our hobbies ... transformational!"

- Jack Barchas, New York, N.Y.

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MyLight has combined classic lamp design with a revolutionary light source. The combination delivers exponentially more light for reading or any other task.

Underlighting is overrated

In your lamps, the new "retrofit" CFL and LED bulbs do not produce the same amount of task light as ordinary bulbs. Just as we've gotten older and our eyesight has declined, **OUR LIGHT HAS FAILED US.**

YOU NEED:

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Compare to any lamp at any price.

SPECIAL OFFER includes KIS lamp, (5) bulbs, lampshade and LED Dimmer.

Easy assembly. Lamp column simply screws into the base.

The **KIS™** Lamp and **LampLight** light source

US PATENTS
10,378,698
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Also includes handheld LED dimmer and switch for brightness control--perfect for adjusting ambient light.



Table lamp height adjusts from 27" to 32"

Table Lamps available in Satin Brass or Brushed Silver



The **LampLight** light source focuses light exactly where it's needed.

Swing arm extends 6"

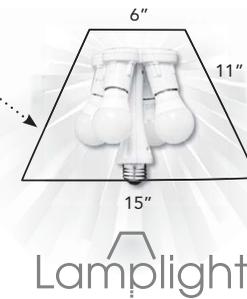
Floor Lamps available in Satin Brass (SHOWN), Gun Metal Bronze and Brushed Silver

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MARKETS DIGEST

EQUITIES

Dow Jones Industrial Average

33301.87 ▼228.96, or 0.68%
 High, low, open and close for each trading day of the past three months.



Current divisor 0.15172752595384
 Weekly P/E data based on as-reported earnings from Biringi Associates Inc.; *Based on Nasdaq-100 Index

S&P 500 Index

4055.99 ▼15.64, or 0.38%
 High, low, open and close for each trading day of the past three months.



Current divisor 0.15172752595384
 Weekly P/E data based on as-reported earnings from Biringi Associates Inc.; *Based on Nasdaq-100 Index

Nasdaq Composite Index

11854.35 ▲55.19, or 0.47%
 High, low, open and close for each trading day of the past three months.



Current divisor 0.15172752595384
 Weekly P/E data based on as-reported earnings from Biringi Associates Inc.; *Based on Nasdaq-100 Index

Major U.S. Stock-Market Indexes

	High	Low	Close	Net chg	% chg	52-Week High	52-Week Low	% chg YTD	3-yr. ann.
Dow Jones									
Industrial Average	33645.83	33235.85	33301.87	-228.96	-0.68	34589.77	28725.51	-0.0002	0.5
Transportation Avg	13894.30	13400.45	13444.01	-496.00	-3.56	15640.70	11999.40	-10.0	0.4
Utility Average	972.76	953.66	954.82	-20.57	-2.11	1061.77	838.99	-6.1	-1.3
Total Stock Market	40763.68	40345.87	40414.80	-165.02	-0.41	43441.80	36056.21	-4.2	4.9
Barron's 400	903.58	891.74	893.68	-9.91	-1.10	1023.20	825.73	-6.1	-2.9

	High	Low	Close	Net chg	% chg	52-Week High	52-Week Low	% chg YTD	3-yr. ann.
Nasdaq Stock Market									
Nasdaq Composite	11967.99	11833.07	11854.35	55.19	0.47	13128.05	10213.29	-5.1	13.3
Nasdaq-100	12929.62	12783.42	12806.48	81.37	0.64	13667.18	10679.34	-1.5	17.1

	High	Low	Close	Net chg	% chg	52-Week High	52-Week Low	% chg YTD	3-yr. ann.
S&P									
500 Index	4089.67	4049.35	4055.99	-15.64	-0.38	4305.20	3577.03	-3.1	5.6
MidCap 400	2454.90	2426.31	2430.17	-21.14	-0.86	2726.61	2200.75	-3.7	-0.01
SmallCap 600	1131.63	1116.73	1119.76	-10.16	-0.90	1315.82	1064.45	-8.4	-3.3

Other Indexes	High	Low	Close	Net chg	% chg	52-Week High	52-Week Low	% chg YTD	3-yr. ann.
Russell 2000	1747.28	1725.82	1730.41	-15.54	-0.89	2021.35	1649.84	-8.2	-1.8
NYSE Composite	15363.53	15201.10	15228.58	-134.95	-0.88	16122.58	13472.18	-3.3	0.3
Value Line	542.72	536.50	537.48	-4.78	-0.88	608.74	491.56	-8.9	0.2
NYSE Arca Biotech	5243.26	5143.17	5177.04	-66.23	-1.26	5644.50	4208.43	9.2	-2.0
NYSE Arca Pharma	890.79	870.20	873.72	-17.07	-1.92	890.79	737.84	4.5	0.7
KBW Bank	80.23	78.23	78.87	-0.82	-1.03	116.90	78.06	-29.8	-21.8
PHLX [®] Gold/Silver	135.81	132.74	133.07	-1.37	-1.02	145.99	91.40	-5.8	10.1
PHLX [®] Oil Service	79.37	76.77	77.38	-0.96	-1.23	93.94	56.08	2.9	-7.7
PHLX [®] Semiconductor	2952.07	2908.41	2922.99	16.70	0.57	3230.86	2162.32	1.0	15.4
Cboe Volatility	19.61	17.87	18.84	0.08	0.43	34.75	16.46	-40.4	-13.1

§Nasdaq PHLX Sources: FactSet; Dow Jones Market Data

Late Trading

Most-active and biggest movers among NYSE, NYSE Arca, NYSE Amer. and Nasdaq issues from 4 p.m. to 6 p.m. ET as reported by electronic trading services, securities dealers and regional exchanges. Minimum share price of \$2 and minimum after-hours volume of 50,000 shares.

Most-active issues in late trading

Company	Symbol	Volume (000)	Last	Net chg	After Hours % chg	High	Low
Meta Platforms	META	11,805.6	233.63	24.23	11.57	241.90	209.12
CIIG Capital Partners II	CIIG	11,524.4	9.17	0.79	9.43	10.48	8.60
iSh MSCI Emerging Mkts	EEM	8,965.6	38.41	...	unch.	38.63	38.41
SPDR S&P 500 ETF Trust	SPY	8,032.6	405.53	1.17	0.29	407.24	404.29
Ford Motor	F	7,338.6	11.57	0.03	0.22	11.62	11.53
Amazon.com	AMZN	4,181.9	106.45	1.47	1.40	106.97	104.86
Alibaba Group ADR	BABA	4,148.3	83.28	0.46	0.56	83.40	82.76
ProShares UltraPro QQQ	TQQQ	4,111.4	26.09	0.47	1.83	26.14	25.61

Percentage gainers...

Company	Symbol	Volume (000)	Last	Net chg	% chg	High	Low
Meta Platforms	META	11,805.6	233.63	24.23	11.57	241.90	209.12
CIIG Capital Partners II	CIIG	11,524.4	9.17	0.79	9.43	10.48	8.60
Teradyne	TER	100.00	6.67	0.79	7.15	101.17	90.90
Sunnova Energy Intl	NOVA	284.2	17.44	1.12	6.86	17.95	16.05
Uranium Energy	UEC	53.1	2.65	0.13	5.16	2.65	2.51

...And losers

Company	Symbol	Volume (000)	Last	Net chg	% chg	High	Low
Impinj	PI	277.3	39.00	-36.32	-26.84	135.32	93.20
Align Technology	ALGN	99.0	99.00	-25.55	-7.21	370.00	322.06
Wolfspeed	WOLF	272.6	53.80	-3.60	-6.27	57.40	52.75
CME Group Cl A	CME	120.2	175.33	-9.60	-5.19	184.93	175.33
United Rentals	URI	104.8	355.60	-19.41	-5.18	384.99	349.00

Trading Diary

Volume, Advancers, Decliners

	NYSE	NYSE Amer.
Total volume*	846,351,901	7,996,973
Adv. volume*	192,386,569	3,177,292
Decl. volume*	633,875,579	4,755,604
Issues traded	3,111	307
Advances	1,011	136
Declines	1,969	151
Unchanged	131	20
New highs	31	4
New lows	101	17
Closing Arms[†]	1.50	1.16
Block trades[‡]	4,051	95

*Total volume[§] 5,281,973,744 290,527,768
 Adv. volume[§] 2,107,020,210 93,850,273
 Decl. volume[§] 3,134,407,163 195,846,553
 Issues traded 4,680 1,743
 Advances 1,785 501
 Declines 2,662 1,220
 Unchanged 233 22
 New highs 51 5
 New lows 408 31
 Closing Arms[†] 1.00 0.83
 Block trades[‡] 44,196 1,463
 †Primary market NYSE, NYSE American NYSE Arca only.
 ‡(TRIN) A comparison of the number of advancing and declining issues with the volume of shares rising and falling. An Arms of less than 1 indicates buying demand; above 1 indicates selling pressure.

International Stock Indexes

Region/Country	Index	Close	Net chg	Latest % chg	YTD % chg
World	MSCI ACWI	642.74	-1.87	-0.29	6.2
	MSCI ACWI ex-USA	300.99	-0.46	-0.15	7.0
	MSCI World	2779.71	-9.83	-0.35	6.8
	MSCI Emerging Markets	967.85	2.25	0.23	1.2
Americas	MSCI AC Americas	1537.95	-5.883	-0.38	5.5
Canada	S&P/TSX Comp	20366.72	-73.15	-0.36	5.1
Latin Amer.	MSCI EM Latin America	2192.07	-13.987	-0.63	3.0
Brazil	BOVESPA	102312.10	-907.99	-0.88	-6.8
Chile	S&P IPSA	3136.65	15.32	0.49	-1.1
Mexico	S&P/BMV IPC	54023.32	-347.77	-0.64	11.5
EMEA	STOXX Europe 600	463.21	-3.87	-0.83	9.0
Eurozone	Euro STOXX	459.49	-2.64	-0.57	12.1
Belgium	Bel-20	3795.60	-30.17	-0.79	2.6
Denmark	OMX Copenhagen 20	2034.57	-57.73	-2.76	10.9
France	CAC 40	7466.66	-64.95	-0.86	15.3
Germany	DAX	15795.73	-76.40	-0.48	13.4
Israel	Tel Aviv	1742.65	...	Closed	-3.0
Italy	FTSE MIB	27107.51	-145.97	-0.54	14.3
Netherlands	AEX	749.60	-5.85	-0.77	8.8
Norway	Oslo Bors All-Share	1367.81	-1.86	-0.14	0.4
South Africa	FTSE/JSE All-Share	78122.12	230.99	0.30	6.9
Spain	IBEX 35	9293.70	3.40	0.04	12.9
Sweden	OMX Stockholm	845.03	-2.17	-0.26	8.1
Switzerland	Swiss Market	11364.91	-148.21	-1.29	5.9
Turkey	BIST 100	4783.50	-107.51	-2.20	-13.2
U.K.	FTSE 100	7852.64	-38.49	-0.49	5.4
U.K.	FTSE 250	19207.97	-7.42	-0.04	1.9

Region/Country	Index	Close	Net chg	Latest % chg	YTD % chg
Asia-Pacific	MSCI AC Asia Pacific	159.78	-0.03	-0.02	2.6
Australia	S&P/ASX 200	7316.30	-5.69	-0.08	3.9
China	Shanghai Composite	3264.10	-0.77	-0.02	5.7
Hong Kong	Hang Seng	19757.27	139.39	0.71	-0.1
India	S&P BSE Sensex	60300.58	169.86	0.28	-0.9
Japan	NIKKEI 225	28416.47	-203.60	-0.71	8.9
Singapore	Straits Times	3293.91	-2.66	-0.08	1.3
South Korea	KOSPI	2484.83	-4.19	-0.17	11.1
Taiwan	TAIEX	15374.63	3.90	0.03	8.7
Thailand	SET	1543.95	3.75	0.24	-7.5

Sources: FactSet; Dow Jones Market Data

Percentage Gainers...

Company	Symbol	Latest Session Close	Net chg	% chg	High	52-Week High	52-Week Low	% chg
SAITECH Global	SAI	3.74	0.95	34.26	11.58	1.00	-64.7	1.0
Intuitive Machines Cl A	LUNR	9.59	2.34	32.28	136.00	7.24	-1.2	1.0
Cryo-Cell International	CCEL	5.33	1.18	28.43	8.12	2.69	-13.0	1.0
VYNE Therapeutics	VYNE	5.60	1.13	25.28	9.90	1.99	-29.8	1.0
Fisker	FSR	5.98	1.08	22.04	11.59	4.27	-41.7	1.0
Presto Automation	PRST	3.72	0.61	19.61	10.70	1.23	-63.3	1.0
BigBear.ai	BBAI	2.87	0.45	18.60	11.61	0.58	-72.9	1.0
PROG Holdings	PRG	30.12	4.52	17.66	31.60	12.11	17.3	1.0
Lyra Therapeutics	LYRA	2.36	0.34	16.83	6.99	1.86	-61.8	1.0
AST SpaceMobile	ASTS	5.15	0.71	15.99	14.27	3.55	-28.3	1.0
Trevi Therapeutics	TRVI	3.38	0.45	15.36	4.68	1.43	13.4	1.0
Texas Community Bcschs	TCBS	11.20	1.40	14.29	17.75	9.39	-34.9	1.0
BT Brands	BTBD	2.85	0.34	13.55	3.03	1.50	-32.6	1.0
Cytek Biosciences	CTKB	10.85	1.28	1				

COMMODITIES

Futures Contracts

Metal & Petroleum Futures						
	Contract					Open interest
	Open	High	Low	Settle	Chg	
Copper-High (CMX) -25,000 lbs.; \$ per lb.						
April	3.8680	3.8660	3.8435	3.8500	0.0040	860
July	3.8660	3.9095	3.8500	3.8615	-0.0035	115,785
Gold (CMX) -100 troy oz.; \$ per troy oz.						
April	1997.80	1998.80	1985.60	1985.70	-8.30	197
May	2000.00	2009.80	1986.60	1986.90	-8.20	1,574
June	2007.70	2020.20	1993.70	1996.00	-8.50	382,741
Aug	2026.00	2039.10	2012.60	2014.90	-8.60	46,236
Oct	2048.70	2056.00	2032.80	2033.40	-8.60	9,832
Dec	2064.00	2075.00	2048.60	2051.10	-8.80	26,293
Palladium (NYM) -50 troy oz.; \$ per troy oz.						
April				1505.10	27.50	50
June	1482.50	1527.50	1481.00	1508.40	27.50	10,127
Platinum (NYM) -50 troy oz.; \$ per troy oz.						
April				1097.10	7.80	3
July	1104.90	1124.00	1100.10	1106.00	7.80	67,456
Silver (CMX) -5,000 troy oz.; \$ per troy oz.						
April	25.130	25.140	25.025	24.871	-0.0066	2
July	25.265	25.515	25.010	25.071	-0.0117	110,369
Crude Oil, Light Sweet (NYM) -100,000 bbls.; \$ per bbl.						
June	77.08	77.93	74.05	74.30	-2.77	347,422
July	76.93	77.70	73.94	74.19	-2.68	235,842
Aug	76.58	77.26	73.63	73.87	-2.59	156,895
Sept	76.00	76.72	73.17	73.42	-2.50	176,867
Oct	75.43	76.09	72.71	72.92	-2.41	105,861
Dec	74.34	74.99	71.76	72.04	-2.19	203,915
NY Harbor ULSD (NYM) -42,000 gal.; \$ per gal.						
May	2.4510	2.4703	2.3693	2.3730	-0.0781	16,900
June	2.4463	2.4676	2.3650	2.3692	-0.0785	81,558
Gasoline-NY RBOB (NYM) -42,000 gal.; \$ per gal.						
May	2.6002	2.6192	2.5417	2.5494	-0.0392	16,444
June	2.5662	2.5880	2.5034	2.5125	-0.0458	100,001
Natural Gas (NYM) -10,000 MMBtu.; \$ per MMBtu.						
May	2.239	2.280	2.101	2.117	-0.190	2,096
June	2.385	2.423	2.274	2.305	-0.132	193,771
July	2.571	2.612	2.476	2.495	-0.133	261,902
Sept	2.625	2.663	2.543	2.553	-0.131	123,352
Oct	2.716	2.755	2.641	2.650	-0.127	106,645
Jan'24	3.857	3.898	3.806	3.819	-0.110	81,451

	Contract					Open interest
	Open	High	Low	Settle	Chg	
Coffee (ICE-US) -37,500 lbs.; cents per lb.						
May	194.15	195.85	194.15	195.85	3.40	502
July	189.50	194.70	188.75	191.60	3.20	86,009
Sugar-World (ICE-US) -112,000 lbs.; cents per lb.						
May	26.70	27.07	26.37	26.51	-1.4	36,804
July	26.02	26.38	25.66	25.78	-1.19	422,681
Sugar-Domestic (ICE-US) -112,000 lbs.; cents per lb.						
July				42.99	-2.5	577
March'24	41.20	41.21	41.20	41.21	-2.1	2,062
Cotton (ICE-US) -50,000 lbs.; cents per lb.						
May				76.51	-4.9	73
July	78.60	79.88	78.09	78.36	-2.6	89,925
Orange Juice (ICE-US) -15,000 lbs.; cents per lb.						
May	285.00	285.00	276.30	276.30	-10.00	896
July	278.85	278.85	269.85	269.85	-10.00	8,181

Interest Rate Futures						
Ultra Treasury Bonds (CBT) -\$100,000; pts 32nds of 100%						
June	141.270	142.210	140.230	141.070	-28.0	1,427,477
Sept	142.090	143.010	141.080	141.210	-28.0	180
Treasury Bonds (CBT) -\$100,000; pts 32nds of 100%						
June	132.070	132.210	131.130	131.230	-21.0	1,192,832
Sept	132.100	132.270	131.220	131.300	-20.0	525
Treasury Notes (CBT) -\$100,000; pts 32nds of 100%						
June	115.240	115.305	115.110	115.175	-8.0	4,352,967
Sept	116.140	116.235	116.040	116.110	-8.0	9,255
5 Yr. Treasury Notes (CBT) -\$100,000; pts 32nds of 100%						
June	110.067	110.110	109.280	110.032	-4.7	4,565,040
Sept	110.220	110.295	110.150	110.215	-5.0	11,051
2 Yr. Treasury Notes (CBT) -\$200,000; pts 32nds of 100%						
June	103.135	103.153	103.071	103.115	-2.1	2,719,339
July	104.007	104.032	103.286	103.307	-3.1	102
30 Day Federal Funds (CBT) -\$5,000,000; 100 -daily avg.						
April	95.1725	95.1725	95.1700	95.1725	.0025	475,674
May	94.9900	95.0100	94.9750	95.0050	0.0100	360,676
10 Yr. Del. Int. Rate Swaps (CBT) -\$100,000; pts 32nds of 100%						
June	98.300	99.060	98.165	98.240	-10.0	6,651
Three-Month SOFR (CME) -\$1,000,000; 100 -daily avg.						
Feb	95.2375	95.2400	95.2375	95.2350	-0.0050	15,941
June	94.9900	95.0200	94.9900	94.9850	-0.150	1,416,844
Eurodollar (CME) -\$1,000,000; pts of 100%						
May	94.6850	94.7150	94.6725	94.6975	-0.0050	52,884
June	94.6400	94.6650	94.6150	94.6500	-0.0200	551,838

Currency Futures						
Japanese Yen (CME) -¥125,000,000; \$ per 100¥						
May	7499	7539	7487	7509	...	904
June	7540	7579	7525	7548	...	178,436
Canadian Dollar (CME) -CAD 100,000; \$ per CAD						
May	7340	7355	7329	7330	-0.002	428
June	7346	7361	7333	7335	-0.002	147,196
British Pound (CME) -£62,500; \$ per £						
June	1.2452	1.2520	1.2409	1.2461	.0048	574
July	1.2421	1.2531	1.2417	1.2470	.0049	219,767
Swiss Franc (CME) -CHF 125,000; \$ per CHF						
June	1.1281	1.1366	1.1271	1.1293	.0012	41,264
Sept	1.1470	1.1471	1.1381	1.1402	.0013	351
Australian Dollar (CME) -AUD 100,000; \$ per AUD						
May	6613	6644	6597	6598	-0.026	292
June	6640	6657	6607	6607	-0.026	177,371
Mexican Peso (CME) -MXN 500,000; \$ per MXN						
May	0.0510	0.0514	0.0548	0.0549	-0.0002	25
June	0.05470	0.0546	0.0546	0.0546	-0.0002	266,595
Euro (CME) -€125,000; \$ per €						
May	1.0986	1.1107	1.0982	1.1051	.0066	1,461
June	1.1010	1.1129	1.1002	1.1073	.0067	759,641

Index Futures						
Mini DJ Industrial Average (CBT) -\$5x index						
May	33726	33762	33347	33424	-228	98,493
Sept	33960	34008	33618	33681	-227	712
Mini S&P 500 (CME) -\$50x index						
June	4110.25	4116.25	4068.75	4076.00	-17.25	2,241,308
Sept	4149.50	4152.50	4106.00	4112.75	-17.00	18,548
Mini S&P Midcap 400 (CME) -\$100x index						
June	2459.20	2466.90	2436.50	2441.10	-21.50	39,346
Sept				2460.10	-21.00	n.a.
Mini Nasdaq 100 (CME) -\$20x index						
June	12940.00	13012.25	12863.75	12887.75	78.25	244,121
Sept	13084.50	13150.00	13006.75	13029.00	80.25	3,211
Mini Russell 2000 (CME) -\$50x index						
June	1754.10	1757.70	1733.00	1737.80	-17.00	511,495
Sept	1767.80	1772.50	1749.10	1753.10	-17.10	3,332
Mini Russell 1000 (CME) -\$50x index						
June	2244.50	2247.80	2225.70	2229.80	-8.30	7,622
U.S. Dollar Index (ICE-US) -\$1,000x index						
July	101.57	101.63	100.74	101.21	-3.9	33,740
Sept	101.26	101.26	100.45	100.88	-4.00	695

Source: FactSet

Cash Prices

These prices reflect buying and selling of a variety of actual or "physical" commodities in the marketplace—separate from the futures price on an exchange, which reflects what the commodity might be worth in future months.

	Wednesday	Wednesday	Wednesday
Energy			
Iron Ore, 62% Fe CFR China-s	n.a.	n.a.	9.6300
Shredded Scrap, US Midwest-s	n.a.	n.a.	6.2375
Steel, HRC USA, FOB Midwest Mill-s	n.a.	n.a.	8.4825
Coal,CapLc,12500Btu,12502-r,w	78.900		7.4250
Coal,Pwr,RvBsn,8800Btu,0.8502-r,w	14.650		
Battery/EV metals			
BMI Lithium Carbonate, EXW China, +99.2%-y/w	27050		
BMI Lithium Hydroxide, EXW China, +55.5%-y/w	34225		
BMI Cobalt sulphate, EXW China, +20.5%-y/w	6004		
BMI Nickel Sulphate, EXW China, +22%-y/w	5402		
BMI Flake Graphite, FOB China, +100 Mesh, 94.95%-y/w	745		
Gold, per troy oz			
Engelhard industrial	2000.00		283.01
Handy & Harman base	2003.00		263.64
Handy & Harman fabricated	2223.33		13973
LBMA Gold Price AM	*1990.20		24000
LBMA Gold Price PM	*1987.40		149.00
Kruggerand,wholesale-e	2075.32		116.50
American Leaf-e	2124.97		116.25
Maple Leaf-e	2124.97		116.50
Maple Leaf-e	2124.97		116.50
Mexican peso-e	2562.07		1.9406
Austria crown-e	1949.63		2.3411
Austria phil-e	2085.25		1.4550
Fibers and Textiles			
Burlap,10-oz,40-inch NY yd-n,w	0.7500		21.55
Cotton,1 1/16 std lw-mdMphs-u	0.7711		0.769
Cotton, A' Index-t	*93.75		62.78
Hides,yv native steers piece fob-u	n.a.		0.9876
Wool,64s, staple, Terr del-u-w	n.a.		1.0386
Grains and Feeds			
Barley,top-quality Mnppls-u	n.a.		0.769
Bran,wheat middlings, KC-u-w	140		0.628
Corn,No.2 yellow,Cent ll-bp-u	6.2300		0.9876
Corn gluten feed,Midwest-u-w	183.8		2.35
Corn gluten meal,Midwest-u-w	587.4		235.50
Cottonseed meal-u-w	365		
Hominy feed,Cent ll-u-w	210		
Meat-bonemeal,50% pr Mnppls-u-w	455		
Oats,No.2 milling,Mnppls-u	3.5250		
Rice, Long Grain Millcd, No. 2 AR-u-w	37.50		
Sorghum,(Hum) No. 2 Gulf-u	n.a.		
Soybean,Meal(Cent ll,rail,48%-u-w)	453.70		
Soybeans,No.1 yllw ll-bp-u	14.2000		
Other metals			
LBMA Platinum Price PM	*1080.0		n.a.
Platinum,Engelhard industrial	1100.0		n.a.
Palladium,Engelhard industrial	1520.0		n.a.
Aluminum,LME, \$ per metric ton	*2131.0		n.a.
Copper,Comex spot	3.8900		n.a.

KEY TO CODES: A=ask; B=bid; BP=country elevator bids to producers; C=corrected; D=CME; E=Manfra, Tordella & Brookes; H=American Commodities Brokerage Co; K=bi-weekly; M=monthly; N=nominal; n.a.=not quoted or not available; P=Sosland Publishing; R=S&L Energy; S=Platts-TSI; T=Cotlook Limited; U=USDA; V=Benchmark Mineral Intelligence; W=weekly; Y=International Coffee Organization; Z=not quoted. *Data as of 4/25

Source: Dow Jones Market Data

Bonds | wsj.com/market-data/bonds/benchmarks

Tracking Bond Benchmarks

Return on investment and spreads over Treasuries and/or yields paid to investors compared with 52-week highs and lows for different types of bonds

Total return	YTD total return (%)	Index	Yield (%)	Total return	YTD total return (%)	Index	Yield (%)
—	—	—	—	—	—	—	—
Broad Market Bloomberg Fixed Income Indices							
2019.36	3.						

BIGGEST 1,000 STOCKS

How to Read the Stock Tables
The following explanations apply to NYSE, NYSE Arca, NYSE American and Nasdaq Stock Market listed securities. Prices are composite quotations that include primary market trades as well as trades reported by Nasdaq BX (formerly Boston), Chicago Stock Exchange, Cboe, NYSE National and Nasdaq ISE. The list comprises the 1,000 largest companies based on market capitalization.

Table with columns: Stock, Sym, Close, Net Chg, Stock, Sym, Close, Net Chg. Lists top 1,000 stocks.

Table with columns: Stock, Sym, Close, Net Chg, Stock, Sym, Close, Net Chg. Continuation of top 1,000 stocks.

Wall Street Journal stock tables reflect composite regular trading as of 4 p.m. and changes in the closing prices from 4 p.m. the previous day.

Table for Wednesday, April 26, 2023. Columns: Stock, Sym, Close, Net Chg. Lists various stocks like ABB, AECOM, AES, etc.

Table for Wednesday, April 26, 2023. Columns: Stock, Sym, Close, Net Chg. Lists various stocks like GE HealthCare, GSK, GlaxoSmithKline, etc.

Table for Wednesday, April 26, 2023. Columns: Stock, Sym, Close, Net Chg. Lists various stocks like T-Mobile, TPG, TRG, etc.

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Dividend Changes

Table with columns: Company, Symbol, Yld%, Amount New/Old, Frq, Payable/Record. Lists companies with dividend changes.

Borrowing Benchmarks

Table with columns: U.S. consumer price index, Inflation, International rates, Prime rates, Policy rates, U.S. government rates, Discount. Lists various financial benchmarks.

New Highs and Lows

Table with columns: Stock, Sym, Hi/Low, % Chg, Stock, Sym, Hi/Low, % Chg. Lists stocks with new highs and lows.

BANKING & FINANCE

Pioneer Natural CEO Sheffield To Retire After 2 Stints at Top

By BENOÎT MORENNE
Scott Sheffield, one of the most prominent oil executives in the U.S., plans to retire as chief executive of Pioneer Natural Resources Co. at year-end.

Mr. Sheffield's second retirement as the head of the company. Mr. Sheffield, 70 years old, previously retired in 2016, only to come back to helm Pioneer in 2019.

vast reserves of oil and gas. Pioneer's premier position in the Permian has made it one of the most attractive acquisition targets in the region.

Mr. Sheffield declined to say whether his pending departure signaled that a deal was more likely. "You can look at it both ways," he said.

China Developer Resumes Buying Residential Land

By REBECCA FENG AND CAO LI
HONG KONG—Country Garden Holdings Co., one of China's largest real-estate developers, bought residential land in a local government auction for the first time since December 2021, signaling confidence in its liquidity and a recovering housing market.

added the sector is "still under great strain" and won't recover overnight. The company plans to focus more on first- and second-tier core cities and gradually increase land reserves and investments in those cities.

The company, which used to be an aggressive acquirer of land, had been hit by a sharp slowdown in China's property sector last year.

Those tend to be larger, denser and more economically prosperous. Hangzhou is one of the wealthiest cities in China's more developed eastern Yangtze River Delta region; its gross domestic product in 2022 ranked ninth among the country's nearly 700 cities.

Its sales of new apartments slumped, and prices of its dollar bonds slid to below 10 cents on the dollar in November, as investors worried that Country Garden could default on its debt like dozens of other developers.

Overall land purchases by developers slowed sharply last year, and have remained depressed so far in 2023—an indication of lower housing supply in the years to come.

The developer's fortunes turned suddenly in late 2022, after Chinese authorities rolled out supportive measures for the housing sector and abandoned their long-running "zero Covid" pandemic restrictions.

In March, the volume of land transactions in 300 cities across China was down 41% from the same period last year, according to China Real Estate Information Corp., which tracks the industry.

Country Garden bought a plot of land on Tuesday in the eastern city of Hangzhou for 2.8 billion yuan, equivalent to \$404 million, according to the developer's official social-media account.

State-owned developers have dominated many public land auctions. Most Chinese private developers have yet to

\$404M
Amount Country Garden paid for a plot of land on Tuesday

Truck Drivers Bear Data-Collection Burden

By ISABELLE BOUSQUETTE

Being a truck driver in the 1980s was terrible. Just ask former driver Darren Suarez, who spent years perched in boiling hot cabs with no air conditioning and the paperwork was voluminous.



Estes Express Lines truck driver Juan Gonzalez shows the app for keeping track of shipment data.

Truck cabs today typically have air conditioning and a lot else has changed, but one thing hasn't: Drivers are still tasked with keeping track of detailed shipment data for logistics companies.

vices like cameras and sensors. For Richmond, Va.-based Estes and other trucking companies, real-time data is vital to optimizing operations and planning pickups, deliveries and driver assignments.

freight transportation company in North America.

network, and can function as that single location.

"Every time I go out on a terminal visit, I will have at least one driver or one dockworker look at me and refer to themselves as having sausage fingers," said Estes Express Lines Chief Information Officer Todd Florence.

In most cases, drivers and dockworkers are typing in information, taking pictures and scanning bar codes throughout a package's life cycle, said Mr. Florence. Sometimes they are inputting the same information in multiple formats—and the data may exist in other company systems, said Mr. Florence, whose company is the largest privately held

Breaking down silos between data in different company systems could be one solution, he said. If all the information about a piece of freight—including information collected by drivers, tracked by office workers and sent in from customers—flowed into one location, there would be less need to collect data that the company may have elsewhere.

So far the company said it has internal savings of about 10% in infrastructure and labor costs by eliminating the need to duplicate or store data across platforms.

The purchase price reflects a premium of 11.88% above the opening price in the auction, according to Zhejiang provincial government records.

resume land purchases, as their focus is still on repaying or restructuring debts, finishing uncompleted projects or selling assets to raise money.

The Wall Street Journal reported in February that Country Garden was preparing to restart land purchases in public auctions. The 30-year-old company is based in Foshan, a city in the southern province of Guangdong, and has long had a dominant position in lower-tier Chinese cities—a strategy that industry analysts said has made it more vulnerable to home-price volatility.

Yuexiu Property Co., a state-owned developer that is also based in Guangdong province, bought more than 30 plots of land in 2022 and at least four so far this year, according to its Hong Kong stock exchange filings.

Country Garden last month reported a loss equivalent to \$873 million for 2022—its first annual loss in more than a decade—and a 18% decline in revenue to \$62 billion. The company said it had the equivalent of \$21 billion in available cash at the end of the year.

Yuexiu's contracted sales in the first quarter this year more than tripled to the equivalent of \$6.3 billion, while Country Garden's slumped by 28% to \$10.4 billion over the same period.

CFOs Stress Keeping Supply Chains Resilient

By JENNIFER WILLIAMS-ALVAREZ

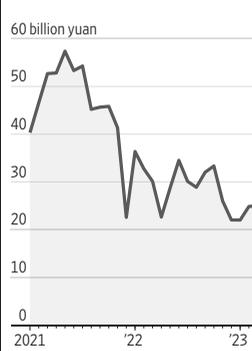
As if finance chiefs didn't have enough on their plates before the pandemic, surging shipping costs, freight logjams and factory disruptions in China over the past few years have laid bare their need to adapt and step up their involvement in boosting supply-chain resilience.

seen some relief as congestion eases and shipping costs plummet, CFOs expect their focus on supply-chain resilience to stick. That entails everything from coordinating and communicating with supply-chain and logistics officers more frequently to allocating funds to improve inventory tracking, boost automation and diversify supply lines to ensure that companies aren't overreliant on any single source of production.

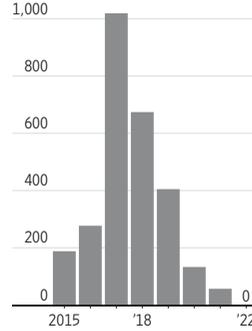
environment means third parties in Conagra's supply chain, including suppliers, sometimes require extra assistance, especially smaller businesses, he said. "It will stay; my involvement will be higher than it was pre-Covid," Mr. Marberger said of his supply-chain focus.

For Jimmi Sue Smith, who leads the finances at Koppers Holdings Inc., supply-chain priorities have shifted. Before the pandemic, Ms. Smith said, supply-chain-related priorities included what costs and inventory levels were and the terms the Pittsburgh-based maker of treated-wood products was getting from vendors.

Country Garden's contracted sales, monthly



Number of residential land plots purchased by Country Garden in public auctions in China



"Supply chain is obviously always an important part for us," said Conagra Brands Inc. Chief Financial Officer Dave Marberger. At roughly \$9 billion, it is the single biggest line item when looking at the cost of goods sold for the Chicago-based food manufacturer, which makes Hunt's ketchup, Healthy Choice frozen meals and Slim Jim meat sticks.

During the pandemic, Mr. Marberger started talking to Conagra's chief supply-chain officer daily, instead of just frequently throughout the week, as the company worked to meet a pandemic-fueled increase in demand. That has largely continued even with Covid-19 disruptions and demand spikes easing, he said, particularly as interest rates rise and inflation remains elevated.

At Cincinnati-based business-services provider Cintas Corp., the finance team is more closely monitoring such things as inventory movement and the amount of stock to carry, said CFO J. Michael Hansen.

"I'm not sure anybody was focusing on [increasing their supplier base] as so much of a risk before because...it had not really happened where all of the sudden you couldn't get things or the ports were jammed up or all of the containers were in China," she said. "After the disruptions that we saw during the pandemic, the focus has shifted a little bit."

—Mark Maurer contributed to this article.

Mutual Funds

Table listing top 250 mutual-funds listings for Nasdaq-published share classes by net assets. Columns include Fund Name, NAV, and YTD % Change. Includes categories like AB Funds, American Century, and Artisan Funds.

Table listing mutual funds with columns for Fund Name, NAV, and YTD % Change. Includes categories like Growth Company, Fidelity, and JPMorgan R Class.

Table listing mutual funds with columns for Fund Name, NAV, and YTD % Change. Includes categories like Vanguard, PIMCO, and Fidelity.

MARKETS

S&P, Dow Slip on Fear of Slowdown

Tech sector is bright spot, with Nasdaq gaining 0.5%, led by Microsoft's 7.2% rise

By DAVID UBERTI
AND CHELSEY DULANEY

Tech companies including Microsoft were among the stock market's few bright spots, as investors digested corporate earnings that offered mixed messages about the U.S. economy. Major indexes on Wednesday morning clawed back some of the previous day's losses before edging lower leading to the closing bell.

The Dow Jones Industrial Average fell 228.96 points, or 0.7%, to 33301.87. The S&P 500 lost 15.64 points, or 0.4%, to 4055.99. The technology-heavy Nasdaq Composite rose 55.19 points, or 0.5%, to 11854.35.

Declining sectors spanned trucking firms, energy producers and regional banks. Tech was the only sector in the S&P 500 to notch gains, according to FactSet, climbing 1.7%.

The darkening outlook, which comes as corporate earnings season kicks into high gear, contrasts with most com-

panies reporting first-quarter performances that beat Wall Street's expectations. In the S&P 500, roughly 80% of the 163 firms that reported earnings as of Wednesday morning had outpaced analysts' projections, according to Refinitiv.

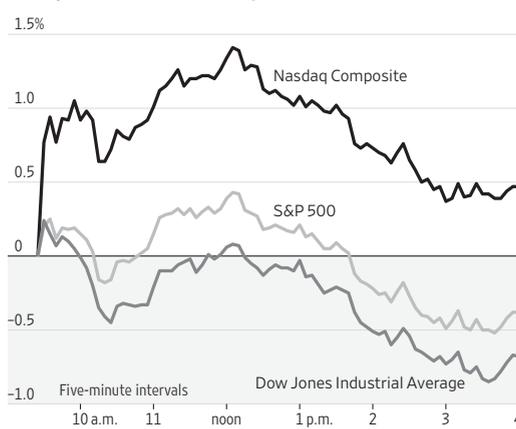
Part of the gloom stems from an emerging consensus that the Federal Reserve will continue raising rates when central bankers meet at its meeting next week. Roughly three-fourths of investors believe that the central bankers will vote for another rate hike, according to CMEGroup, a move aimed at discouraging lending to businesses and consumers.

"That influences the economy, which then ripples through and influences earnings," said Jason Pride, chief of investment strategy and research at Glenmede.

Companies from Google parent Alphabet to shipping giant United Parcel Service have warned investors of petering U.S. growth. But hiring has remained robust and the U.S. service sector has proved resilient despite softening manufacturing activity and declining home sales.

The slowdown "is taking so long to play out that it's not fully reflected in the market," Mr. Pride added.

Index performance Wednesday



Source: FactSet

Technology firms largely shielded investors from steeper losses. Microsoft was the Dow's best-performing stock, jumping \$19.95, or 7.2%, to \$295.37 after reporting continued growth in its cloud-computing business and as the U.K. rejected its takeover attempt of game developer Activision Blizzard.

Shares in the "Call of Duty" developer dropped \$9.93, or 11.45%, to \$76.81 after the U.K. antitrust watchdog raised a major hurdle to global approval of the \$75 billion deal.

Other big tech stocks were mixed as investors weighed new initiatives such as artificial intelligence against an uncertain economic outlook.

Alphabet fell 14 cents, or 0.1%, to \$103.71 after the company reported a second consecutive quarter of declining ad sales. Amazon.com, which is slated to report its first-quarter results on Thursday, rose \$2.41, or 2.4%, to \$104.98. Facebook owner Meta Platforms rose about 12% in after-hours trading after reporting higher revenue.

"It's reassuring for a lot of investors that tech earnings have been better," Chris Beauchamp, chief market analyst at IG Group. "But you want to see other parts of the S&P 500 pick up. You need more than tech."

In other sectors, executives said that the Fed's attempt to cool inflation was beginning to take hold, contributing to investors pulling back from those stocks.

Shares in solar-energy manufacturers slid after Enphase Energy warned of waning appetite for investment in such systems. Enphase plunged \$56.77, or 26%, to \$163.83, making it one of the S&P 500's worst performers.

"The demand will unleash only when the interest rates are back to normal," Chief Executive Badrinarayanan Kothandaraman told analysts.

U.S. central bankers have signaled that another rate increase is on the table next week, even amid growing fears of a recession and stress on regional banks.

First Republic Bank on Wednesday fell \$2.41, or 30%, to \$5.69, extending a sharp selloff and leaving the beleaguered San Francisco bank with a market cap of around \$1 billion. PacWest Bancorp., jumped 77 cents, or 7.5%, to \$11.08.

In the bond market, the yield on the two-year Treasury note rose to 3.924%, while that on the 10-year rose to 3.429%.

In commodities markets, U.S. oil fell \$2.77, or 3.6%, to \$74.30 a barrel.

Overseas, Europe's Stoxx 600 fell 0.8%. Early Thursday, Japan's Nikkei 225 was down 0.2%. S&P 500 futures rose 0.25%.

AUCTION RESULTS

Here are the results of Wednesday's Treasury auctions. All bids are awarded at a single price at the market-clearing yield. Rates are determined by the difference between that price and the face value.

17-WEEK BILLS

Applications	\$103,371,130,000
Accepted bids	\$36,830,731,000
* noncompetitively	\$79,536,700
* foreign noncompetitively	\$0
Auction price (rate)	98.355486 (4.975%)
Coupon equivalent	5.142%
Bids at clearing yield accepted	58.94%
Cusip number	912797GJ0

The bills, dated May 2, 2023, mature on Aug. 29, 2023.

FIVE-YEAR NOTES

Applications	\$113,346,060,700
Accepted bids	\$47,136,460,700
* noncompetitively	\$84,059,700
* foreign noncompetitively	\$0
Auction price (rate)	99.999837 (3.500%)
Interest rate	3.500%
Bids at clearing yield accepted	65.00%
Cusip number	91282GHA2

The notes, dated May 1, 2023, mature on April 30, 2028.

TWO-YEAR FRNs

Applications	\$75,314,706,900
Accepted bids	\$26,342,256,900
* noncompetitively	\$59,507,200
Spread	0.169%
Bids at clearing yield accepted	24.34%
Cusip number	91282GVI1

The floating-rate notes, dated May 1, 2023, mature on April 30, 2025.

PwC to Spend \$1 Billion on AI

By ANGUS LOTEN

PricewaterhouseCoopers LLP plans to invest \$1 billion in generative artificial-intelligence technology in its U.S. operations over the next three years, working with Microsoft Corp. and ChatGPT maker OpenAI to automate aspects of its tax, audit and consulting services.

The accounting and consulting giant said the multi-year investment, announced Wednesday, includes funding to recruit more AI workers and train existing staff in AI capabilities, while targeting AI software makers for potential acquisitions.

Generative AI tools are designed to generate natural-language responses, images or computer code from user text prompts.

For PwC, the goal isn't only to develop and embed generative AI into its own technology stack and client-services platforms, but also advising other companies on how best to use generative AI, while helping them build those tools, said Mohamed Kande, PwC's vice chair and co-leader of U.S. consulting solutions and global advisory leader.

Mr. Kande said the company would pay to access OpenAI's GPT-4 language model, the underlying software that drives ChatGPT, to build and run apps in Microsoft's Azure cloud. While ChatGPT is a free online tool, OpenAI charges developers to access its language model and create their own software tools. The model, which was recently upgraded, is trained on large stores of language data gathered from online posts, interviews and other sources, to understand natural-language prompts and produce intelligible responses.

Once the models are fully trained and tested, Mr. Kande sees the technology being used to quickly write reports and prepare compliance documents, analyze and evaluate business strategies, identify inefficiencies in operations or create marketing materials and sales campaigns, among many other applications.



The auditing and consulting company hopes to use OpenAI tech to automate aspects of its business.

"This is about using generative AI to run the company in a more efficient way," Mr. Kande said. "Embracing this technology is critical."

Eric Boyd, corporate vice president of Microsoft's AI platform, said the move will enable PwC to access OpenAI's generative AI tools with the added compliance and data security of its Azure cloud-computing service. Microsoft itself announced a multiyear, multi-billion-dollar investment in OpenAI, a startup launched in 2015.

Mr. Boyd said more than 1,000 organizations—including startups and multinational corporations—are now using OpenAI tools in Microsoft's cloud in areas like customer support, conversational AI, summarization, writing assistance and customization by "gaining insights from data using search, data extraction and classification," he said.

Other large accounting firms, including KPMG LLP and Ernst & Young, are also investing in generative AI. TurboTax owner Intuit Inc., for instance, is building its own generative AI language model for financial management, trained on years of interactions with its business

customers, the company said. Accounting, tax preparation, auditing and other financial services are ripe areas for generative AI, analysts said.

"Generative AI offers many attractive use cases for companies like this," said Rowan Curran, an analyst at informa-

The technology could quickly write reports and analyze business strategies.

tion-technology research firm Forrester Research Inc., covering data science, machine learning, artificial intelligence and computer vision.

Mr. Curran said large language models like GPT-4 can be used to help with information discovery and retrieval—particularly in exploring unstructured and semi-structured data—along with the potential to improve the process of preparing reports with a "much lower effort from the human auditors." After the initial burst of interest in generative AI sparked by ChatGPT, which launched in

November, companies are now moving into a phase of experimenting, building and deploying their first-generation applications, he said.

In a survey of about 500 corporate IT decision makers conducted by market research firm Enterprise Technology Research, 53% said they planned to evaluate, use or allocate further resources to OpenAI's ChatGPT technology—a record for any single technology provider, said ETR's Chief Strategist Erik Bradley. Consulting and business-services firms, along with educational institutions, were the leading sectors in plans to evaluate and use generative AI and large language models, according to the survey.

"The outsized investments in generative AI make perfect sense for organizations trying to do more with less," Mr. Bradley said. "The real question is, will all of this initial investment and evaluation turn into actual business utilizations."

Watch a Video



Scan this code for a video on who's on the hook with AI gets it wrong.

Korea Stocks Defy Sluggish Economy

By FRANCES YOON

Should a slowing economy lead to a weak stock market? Not judging by the performance of South Korea's benchmark index this year.

The country's stock market is the best performer in Asia and one of the top indexes in the world so far this year. The Kospi Composite Index has risen more than 11% since Jan. 1, fueled by a rally in the shares of big technology companies such as Samsung Electronics Co. and SK Hynix Inc., which together account for one-fifth of the index.

The rise in share prices has come despite a slumbering economy that contracted on a quarter-on-quarter basis at the end of last year, amid weak exports and lackluster consumption. Korea avoided a technical recession in the first three months of 2023, thanks to a quarterly expansion of around 0.3%, but most economists expect growth to remain sluggish this year. Economists at ING are predicting annual growth of 0.9%, down from a 2.6% expansion in 2022.

The strong performance of the stock market is partly because investors have shifted to betting on a recovery after a sharp fall last year, said Homin Lee, senior macro strategist, Asia, at Lombard Odier.

Some investors are buying shares of Korean tech companies with a recovery in mind in 2024, when earnings are expected to improve as lower interest rates boost corporate demand for chips. Samsung Electronics and SK Hynix both make such products.

The long-term optimism is being fueled by the hope that Korea will emerge as a winner from shifts in global supply chains, particularly since the country has a strong relationship with the U.S.

"As countries around the world such as the U.S. and India look to diversify supply chains away from China, South Korea is one market that seems best positioned for that," said

Index performance in 2023



Source: FactSet

Vikas Pershad, portfolio manager at M&G Investments.

There also is growing confidence that South Korea could finally be classified as a developed market by MSCI Inc. this year. Analysts at Goldman Sachs Group Inc. have estimated an MSCI upgrade could trigger more than \$44 billion in foreign inflows as investors who track developed markets indexes add South Korean stocks to their holdings. The MSCI Korea index has easily outperformed the global benchmark this year.

Foreign funds dedicated to Korean equities got \$1.9 billion of inflows this year, up from \$1.6 billion during the same period in 2022, according to data from EPFR.

There are some reasons for caution. The daily turnover of short positions on Korean equities hit around \$1 billion on April 4, the largest daily figure on record, according to the local stock exchange.

There also are worries that the rally might have been too much, too fast. Individual investors have been driving stock prices of local electric-vehicle battery makers to levels that are starting to look expensive, said Yoojeong Oh, investment director for Asian equities at Abrdn. She added that her firm is selectively invested in that sector.

Crypto Firms Buy Treasuries

Continued from page B1 for fast trading and earn a return on idle cash.

Of course, traders can always sell their stablecoin holdings and park them in Treasury bills directly without taking the risk of going through a third party and paying a fee.

Austin Campbell, an adjunct professor at Columbia Business School, said that the new

crypto products are vulnerable to traditional financial risks such as interest-rate changes as well as crypto-specific risks like hacking.

"It really feels to me like they exist to offer U.S. risk-free rates to non-U.S. persons," Mr. Campbell said. "Until utility in crypto picks up significantly, it's hard to see why I wouldn't just buy Vanguard's government money-market fund."

The trend also appears at odds with the ethos of DeFi, which hopes to eliminate human intermediaries and disrupt traditional finance, some market observers say.

"You are supposed to be decentralized but you are holding all these centralized as-

sets," said Campbell Harvey, a finance professor at Duke University.

But with the value of assets held on DeFi platforms down to about \$49 billion from a peak of over \$180 billion in 2021, according to DeFi Llama data, some crypto companies are fine with embracing the financial establishment.

Earlier this year, startup Ondo Finance launched a tokenized version of the iShares Short Treasury Bond ETF with a yield of 4.65%. The fund, which also includes a small portion of USD Coin and U.S. dollars, recently surpassed \$100 million in assets under management.

Ondo Finance Chief Executive Nathan Allman said his

firm initially launched the tokenized Treasury product to attract startups and DeFi platforms that want to earn a yield on their corporate treasury funds. Instead, he has heard from over-the-counter trading desks and market makers who want to use the product as a substitute for stablecoins to settle their trades or as collateral for loans.

While stablecoin issuers earn interest from investing their dollar reserves in government bonds, the interest isn't passed on to stablecoin holders, leaving them with no return.

"It's very evident that there's \$100 billion plus in stablecoins earning no yield,"

said Mr. Allman. "I mean, that is just an insanely compelling short-term opportunity. There's basically no reason to hold stablecoins for any material amount of time."

Some analysts believe that the trend also ties into the growing interest in tokenizing real-world assets. Private-equity firm KKR & Co. was one of several traditional asset managers that put their funds on the blockchain last year in an effort to attract individual investors to private markets.

"This is part of the tokenization that we're starting to see gathering momentum," said Noelle Acheson, a crypto macro strategist.

Meanwhile, investors have

flocked to money-market funds after last month's banking-sector upheaval. Assets in such funds have swelled to over \$5 trillion, according to Investment Company Institute data.

Traditional asset manager Franklin Templeton's tokenized money-market fund, Franklin OnChain U.S. Government Money Fund, recently surpassed \$270 million in assets.

"Depending on what those investors are holding for that cash-like component of their portfolio currently, unlike stablecoins, a tokenized money-market fund actually offers a competitive yield," said Roger Bayston, Franklin Templeton's head of digital assets.

HEARD ON THE STREET

FINANCIAL ANALYSIS & COMMENTARY

Skies Darken for Rooftop Solar Power

Enphase says rising interest rates and new net metering rules in California are casting a shadow over growth prospects

The U.S. rooftop solar business has grown with two essential catalysts: low interest rates, which make such installations affordable for consumers, and state-level policy that handsomely rewards households with such solar systems for selling excess solar energy back to the grid. Both of those are going in exactly the wrong direction at the moment.

Enphase Energy, a company that manufactures microinverters for rooftop solar panels and energy storage systems, confirmed that on its earnings call late Tuesday.

The company's stock fell 26% in Wednesday's trading, dragging down other solar-company stocks.

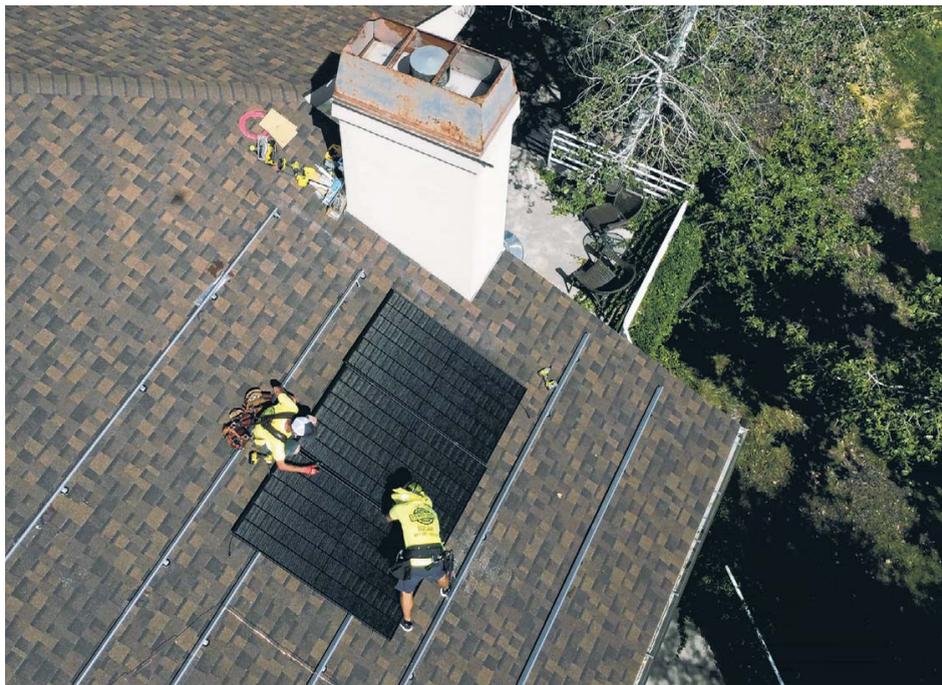
SunPower and **SolarEdge Technologies** declined 9% and 10%, respectively.

Enphase itself had solid high-level numbers to report for its first quarter: Total revenue was roughly flat compared with a quarter earlier, largely as Wall Street analysts expected.

The company's net income was 46% higher than what analysts had projected. Revenue guidance for the second quarter, though, was weaker than their expectations, and commentary about the U.S. market was a sobering reminder of near-term challenges for the solar industry.

The company said its sell-through of microinverters in the U.S. was 21% lower in the first quarter compared with the previous quarter, which was worse than the typical seasonal decline of 15%.

Sell-through was particularly weak in states with lower utility rates such as Texas, Florida and Arizona, according to the company. In such states, higher interest rates have made rooftop solar a much



Wood Mackenzie expects the U.S. residential solar market to contract by 3% in 2024. Solar-panel installation in Utah.

harder sell to households compared with states in the Northeast where utility rates are higher.

The recent banking turmoil also has raised financing costs and tightened credit standards for solar loans, according to a recent report from Zoë Gaston, analyst at research firm Wood Mackenzie.

Another source of uncertainty comes from California, the largest rooftop solar market.

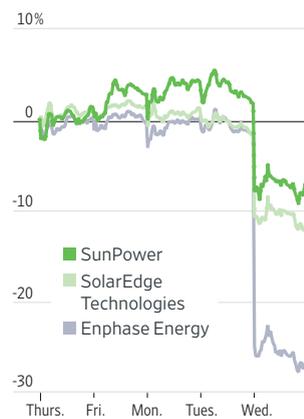
The state last year changed the way rooftop solar customers get

compensated from selling excess solar energy back to the grid. The new rule—known as net energy metering 3.0—effectively reduced the amount rooftop solar customers get for selling excess energy by 20% to 30%, according to ClearView Energy Partners. In the near term, the change actually boosted demand in California as customers rushed to install solar systems before the new rules kicked in for solar systems. The older, more generous solar rates

still apply to systems for which interconnection applications were submitted before April 15. Wood Mackenzie expects the U.S. residential solar market to contract by 3% in 2024, which would be the first full year affected by California's new rules.

Enphase thinks these challenges are temporary and said California's policy change should boost its energy storage business over the long term. Notably, under the new rules, the rate that solar or solar-plus-

Stock price performance



Source: FactSet

storage customers receive is based on the avoided cost to utilities, or the marginal cost utilities would avoid if these home energy systems provided power instead of themselves. In peak air-conditioning months, such as August and September, when energy demand stays high in the evening while supply is tight after the sun goes down, homes with battery storage would benefit from higher compensation.

That may be true but, as Enphase itself says, it could take time for customers to realize that benefit. Meanwhile, there is no visibility on when interest-rate increases will pause. As long as those two shadows persist, investors will find it difficult to focus on the glimmering, long-term promises to solar offered by the Inflation Reduction Act.

—Jinjo Lee

Microsoft Has Game With or Without a Deal

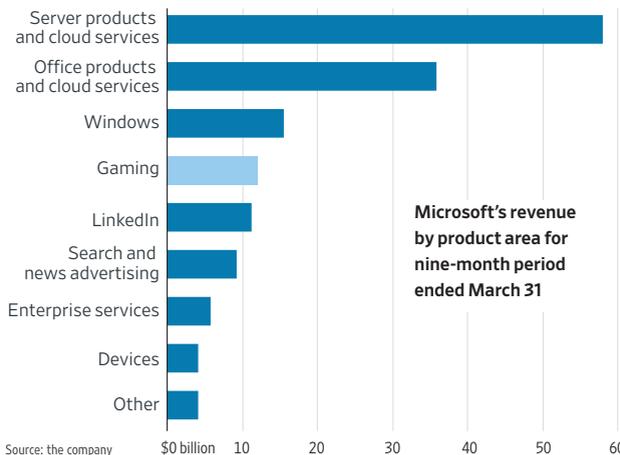
Microsoft will be just fine without **Activision Blizzard**, though its cloud game ambitions might not be.

The U.K.'s Competition and Markets Authority rejected Microsoft's \$75 billion deal to buy Activision on Wednesday.

The agency, which is the country's main antitrust watchdog, ruled the deal would harm the nascent market for cloud-based videogame services by giving the owner of the Xbox platform control over Activision's popular game franchises such as "Call of Duty." In its statement, the CMA said Microsoft "would find it commercially beneficial to make Activision's games exclusive to its own cloud gaming service," thus stifling future competition.

Both companies vowed to appeal the ruling. They could be on solid ground arguing the decision reflects a misunderstanding that Microsoft needs to make Activision's games exclusive to financially benefit from having those games on the cloud. Nevertheless, the decision is a setback to a deal that had been looking more likely lately, following a 15-month slog through the regulatory approval process.

Activision shares slid nearly 12% on Wednesday, even though the company pushed out its first-quarter results a day early showing better-than-expected revenue for the period. Analyst Doug Creutz of TD Cowen said the deal's chances of success "are no more than 10%" in a note to clients Wednesday morning.



Microsoft shares jumped 7.2%, thanks mostly to the surprisingly strong results the company reported the previous evening for its fiscal third quarter. What was expected to be a bleak operating period turned out to be hardly so. Revenue of \$52.9 billion was up 7% year over year, which was below the double-digit streak the company maintained for five years before the last quarter, but more than twice the growth rate Wall Street expected. Operating profit beat analysts' estimates by 9%, and Microsoft issued a revenue and operating profit forecast for the June quarter that exceeded projections.

The results showed strength across business lines—even the sagging market for personal comput-

ers. Windows Commercial, which reflects volume licensing for the company's storied operating system, saw revenue jump 14% year over year during the quarter. And the far more crucial cloud business stayed afloat as well, despite persistent signs that large corporate tech buyers are slowing down or "optimizing" their spending on such services. Revenue from the company's Azure public cloud service grew 27% year over year, which was its slowest growth on record but one point better than analysts' projections. Operating earnings for the Intelligent Cloud segment that is Microsoft's largest profit source were 5% above consensus estimates.

Even more notably, the company is seeing some early traction for its

high-profile efforts in generative artificial intelligence. It projects that Azure revenue will grow between 26% to 27% from a year earlier in the June quarter, which Chief Financial Officer Amy Hood said includes one point from AI services.

While seemingly small, Mark Moerder of Bernstein called the contribution from AI "a huge number" considering Microsoft only announced those services recently. "If this trend continues, then AI will be a very large driver of the size of Azure's long-term revenue and will require re-evaluation of how big Azure could be," Mr. Moerder wrote Wednesday.

Azure is more than three times the size of Microsoft's gaming business, and doesn't even reflect the full extent of its cloud operations. Still, losing Activision would be a setback to Microsoft's effort to usher the videogame market to a cloud-based business model. Microsoft was best suited for such an endeavor, given its financial heft and the cloud-first business model that reshaped the company.

But cloud gaming needs hit games to succeed and past efforts failed because major independent publishers such as Activision are hesitant to disrupt their existing business models. A streak of scandals at Activision created an opportunity for Microsoft to acquire the high-profile game titles needed to push cloud gaming to the next level. Without "Call of Duty," that job gets much harder.

—Dan Gallagher

For Scott's Miracle-Gro, Grass Isn't So Green

April showers don't always bring May flowers.

Last spring, **Scott's Miracle-Gro** suffered a washout as a cool, damp spring in many parts of the country hurt sales of its lawn care products.

Its big bet on cannabis was a major downer too: That market is glutted with hydroponic equipment a separate unit sells. Now, with the stock down nearly 12% since last week and quarterly results due on May 3, investors appear nervous.

Or maybe they were just high on their own supply earlier this year.

The stock rose by as much as 80% in the first seven weeks of 2023 in a rally that saw many of last year's losers surge, irrespective of quality. (Hello, Bed Bath & Beyond.) The shares have given back about half of those gains and are well off their 2021 levels, when its pot business and a gardening boom in the pandemic briefly sent the stock above \$250.

Even in January 2022, it was as high as \$160 but crashed below \$40 in the fall, enticing some value investors who saw the selloff as overblown.

The company, which is in a quiet period ahead of earnings, didn't respond to a request for comment.

Analyst consensus forecasts for the current fiscal year, which ends in September, are for the company to earn \$3.18 a share, but that expectation was \$3.58 in January and \$9.01 a year ago, according to FactSet.

While there might well still be value as the company cuts costs, spring isn't always a time of renewal. Amid a big marketing push, poor consumer uptake or imperfect weather conditions could spook investors next week.

And the company's direct bet on cannabis through financial exposure to a New York growing operation is a concern, too. As any visitor to New York City can see—and smell—there is plenty of marijuana around but little that appears to be regulated.

Like suburban homeowners obsessed with their lawns, Scott's shareholders know that there is only so much the company can control to make them see green.

—Spencer Jakub

First Republic Finds Itself in a Catch-22 Situation

First Republic Bank stock price



Source: FactSet

First Republic Bank is back, hat in hand. Its rescuers from March have reasons to keep ponying up, but a solution will still be devilishly hard to reach.

The beleaguered bank needs to shed assets from its balance sheet to pay back the expensive debt that is propping it up. But rising rates have reduced the market value of those assets, so it can only sell them quickly by posting a right now.

So First Republic has proposed a new rescue plan to the 11 banks that deposited \$30 billion with it last month. It wants them to buy its loans or securities at prices above market value, The Wall Street Journal reported.

Why would a buyer go along

with that? Well for one thing, those banks' deposits at First Republic are uninsured. If they thought it was about to go under, they could be at risk of losing that money outright.

Even if the federal government used emergency powers to backstop those deposits, big banks would be on the hook for replenishing funds at the Federal Deposit Insurance Corp. But this puts First Republic and its advisers in a somewhat awkward position because a deal only becomes more likely as the bank's demise appears more imminent.

Banks that buy First Republic's assets could be compensated for their immediate losses in the form of warrants for the company's equity. But this would dilute existing

shareholders, sending First Republic stock down even more and further undermining confidence in the bank. This helps explain why shares were down again on Wednesday despite the reports of another potential rescue package.

Ideally for First Republic, it would be given time to get its balance sheet in shape, such as by making loans, selling them, and using the proceeds to pay down debt, as it said it intends to do on Monday in a quarterly update. But the bank provided no clarity as to how long this might take. And as the market reaction to that update shows, few are inclined right now to grant it much time at all. So someone may have to pony up even more rescue cash instead.

—Aaron Back



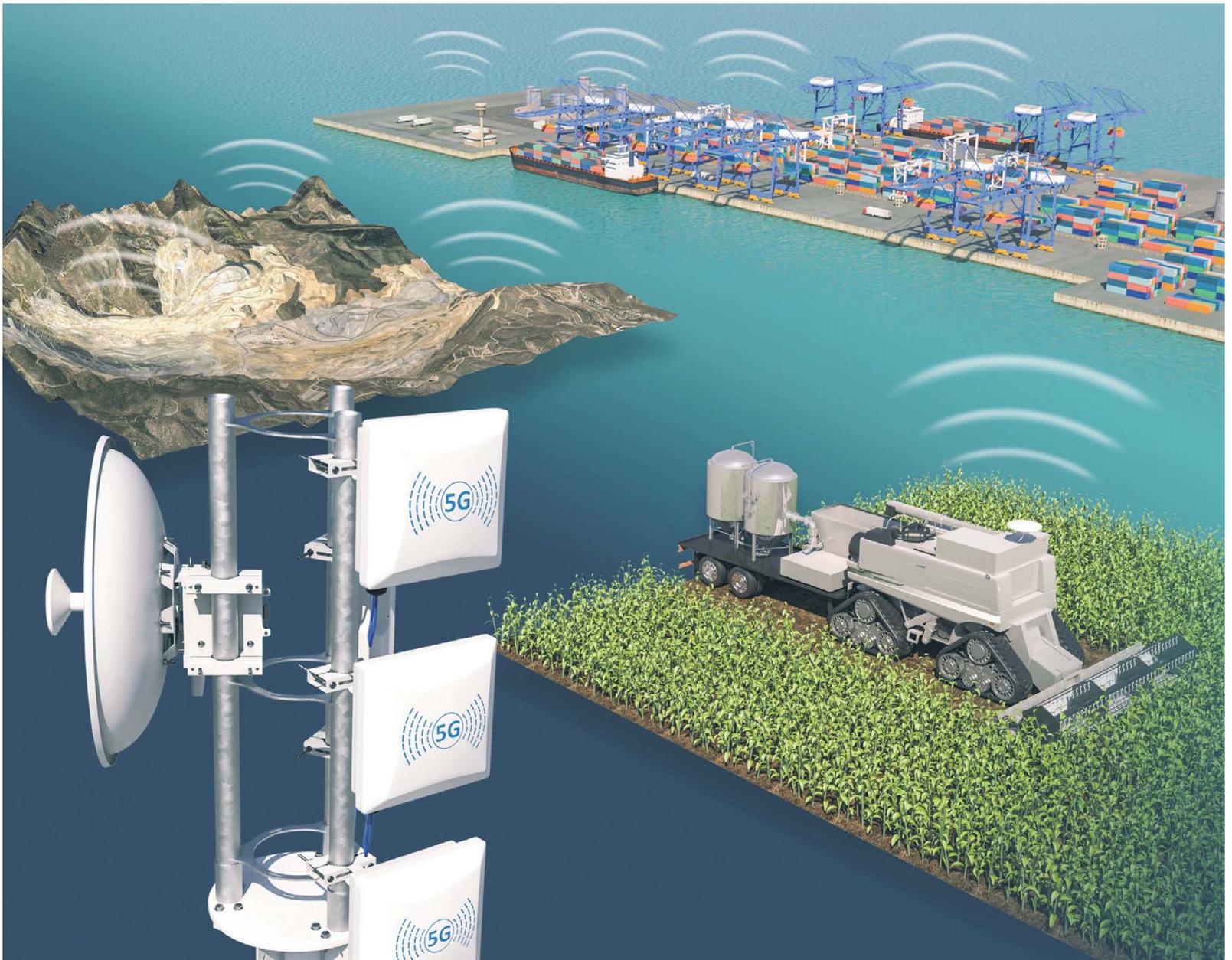
JOURNAL REPORT

5G TECHNOLOGY

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THE WALL STREET JOURNAL.

Thursday, April 27, 2023 | R1



JOSHUA BAUER

Telecom Companies Pin 5G Hopes on Private Industrial Networks

Their pitch is that the benefits to manufacturers, mining companies and others are easier to grasp than in the consumer market

BY SUMAN BHATTACHARYYA

FOR SEVERAL YEARS, telecommunications companies have been talking about the just-around-the-corner 5G boom. It's a world where consumers will enjoy more reliable service and faster data-transmission speeds, an environment where autonomous vehicles and other internet-connected devices will flourish.

Companies have bet a lot on this vision. Overall capital spending on this fifth generation of cellular

technology is close to \$300 billion, according to Stefan Pongratz, an analyst at market-research firm Dell'Oro Group.

But as 5G networks become more widely available to consumers, companies in the 5G ecosystem—including telecommunications providers, network-equipment manufacturers and others—are realizing that consumers aren't where the potential payoff is. Instead, they are betting that private 5G

Please turn to page R4

Government's High-Speed Internet Plan Needs Workers

Shortage of fiber technicians casts doubt on the goal to bring fast internet to every home this decade

BY WILL FEUER

THE FEDERAL government is missing a crucial link in its plan to greatly expand access to high-speed internet service in rural America: enough workers to get the job done.

Fiber splicers—the workers who

install, maintain and repair wired broadband networks—are in short supply. "We're running around like chickens with our heads cut off," says Jason Jolly, chief executive of Fiberscope LLC, a Sullivan, Mo.-based company that does contracted fiber-splicing work. Mr. Jolly says his five-person crew has been "getting nonstop calls for the

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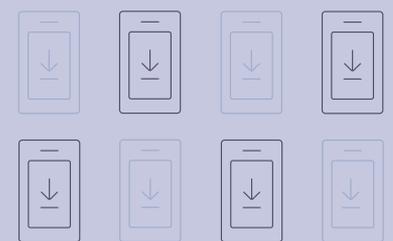
Inside

VR AND AR ON THE GO

5G could free virtual- and augmented-reality devices from Wi-Fi **R2**

Disconnect

The U.S.-China rivalry makes global satellite-phone service a tricky proposition **R4**



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JOURNAL REPORT | 5G TECHNOLOGY

5G Could Untether Augmented- and Virtual-Reality Devices From Wi-Fi

VR headsets and AR glasses have largely been limited to home and office settings. The hope is that 5G will let them be used on the go.

VIRTUAL and augmented reality are often heralded as the next big internet platforms for consumers. But snagging that prize may hinge on people's ability to use those platforms on the go.

Both depend on the ability to beam huge, uninterrupted data streams to VR headsets or AR glasses seamlessly, and that so far has limited the use of such products largely to home and office settings, where Wi-Fi and power outlets are handy.

But companies now are testing whether 5G networks or other future wireless technology can make the difference, providing all the streamed data and at the necessary speeds for mobile use—in effect, helping consumers break free from the confines of indoor plugged-in networks.

Uninterrupted gigabytes of data are necessary for both augmented-reality glasses, whose wearers see the real world and digital data simultaneously, and virtual-reality headsets, which allow users to move about in virtual realms. Even slight hiccups in the streaming can ruin the experience, blurring graphics and making users queasy.

Hence the interest of telecommunications companies looking for ways to increase demand for their 5G networks.

"AR specifically is one of the bigger areas that will leverage 5G outside of smartphones," says Phil Solis, a research director at International Data Corp. "It could be things like gaming—Pokémon Go was big at one point—or it could be something useful like navigation."

Signs of progress

Tech companies such as **Microsoft Corp.**, **Snapchat** parent Snap Inc., **Meta Platforms** Inc. and startup **Magic Leap** Inc. for years have worked on adding significant computing power to AR and VR systems without draining batteries, while also creating a comfortable device that can be worn for long periods. But the technology has seen limited adoption by consumers.

Microsoft has opted to focus more on business uses. Snap limits its augmented-reality glasses to creators looking to push the limits of immersive AR experiences and hasn't rolled them out to the general public. People who have used Meta's Quest headsets to access the virtual-reality app Horizon Worlds have said it is glitchy and riddled with bugs, according to internal company documents. All three companies

of that. It will be a completely essential component for outdoor and city-scale AR experiences."

Mobile-chip giant **Qualcomm** Inc. has released technical blueprints of sleek, 5G-capable AR glasses to demonstrate to manufacturers what's possible using the company's chips, according to Hugo Swart, who heads AR and VR efforts at Qualcomm. The devices aren't commercially available, he says, but such so-

support several dozen people using high-quality VR headsets when superfast networking and data-processing capabilities are close at hand, says Paul Jacobs, a former chief executive at Qualcomm and now CEO of San Diego-based XCOM.

XCOM last year joined forces with the Void—a company that specializes in immersive cinematic VR experiences where users can look around and interact with their virtual environments—to demonstrate how multiuser wireless VR could work.

Dreamscape Immersive, a virtual-reality entertainment tech company, is also trying to use 5G

network, the company says it will soon replace the backpack with a small device that's worn like a necklace in trial runs.

"Everything that was sitting there on your back is now in the back room," Mr. Grosky says. He adds that Dreamscape Immersive's sister company, Dreamscape Learn, which focuses on education using VR, is also hoping to use the 5G technology to expand its use cases. Currently, its immersive technology is being used in biology classes at Arizona State University, but the VR headsets are tethered to the desk setups, he and a spokesperson for Arizona State say.

Summit Tech, an information technology and services firm, has launched a 5G-enabled 360-degree virtual live-streaming platform that allows for two-way interaction in what has traditionally been a one-sided experience. Users can don a headset, or use their smartphone, to become immersed in an interactive live stream of a concert, shopping or other event.

Still far to go

Though the higher data-transfer rates that 5G offers cut down on image-processing delays and glitches, the current technology has limits. Current networks wouldn't be able to handle the huge amounts of data needed if a large number of wireless headsets are in use in the same location, industry officials say. Catering to such uses could require telecommunications companies to move the servers that handle the data closer to wireless antennas and to invest more heavily in advanced networking equipment that isn't yet widely deployed, the officials add.

Ultimately, Qualcomm's Mr. Swart says, the industry is waiting for more AR and VR headset sales to lead to more games and movies being made for them, which ought to generate more interest from new users. And that, the industry hopes, could convince wireless network operators to upgrade equipment to cater to that demand.

"I do think that within the next couple of years, we are going to start to see that," he says. "It's not going to be in two years yet for everyone in the world to use, but it's going to be much higher than today and it's going to be much better than today."

Ms. Bobrowsky and Mr. Fitch are Wall Street Journal reporters based in the San Francisco bureau and New York, respectively. Email them at meghan.bobrowsky@wsj.com and asa.fitch@wsj.com.



have signaled that they are committed to the technology and working to improve it.

Daniel Diez, Magic Leap's chief transformation officer, says his company is looking to leverage 5G technology to open up its next-generation device to more use cases, including outdoors.

"If you're able to offload more of the computing that has to currently happen on the device to either edge computing or the cloud," Mr. Diez says, "you can make the device smaller. You can use less battery power and 5G will be an essential component

called reference designs often portend what's coming from major manufacturers that incorporate showcased features in their own products. Companies working on AR glasses powered by Qualcomm's chips include TCL Technology, **Xiaomi** Corp. and Niantic Inc., the company behind Pokémon Go.

XCOM Labs, which specializes in wireless technology for mobile networks, is developing AR and VR equipment in carefully controlled settings that could presage broader deployment as the technology develops. XCOM can

technology to untether its VR experiences. The firm provides VR interactive exhibits to consumers at its hubs around the world.

Participants historically had to put on a heavy backpack containing a computer tethered to the VR headset, says Dreamscape Chief Operating Officer Aaron Grosky. But the company, he says, is testing a way to ditch the heavy weight that detracts from the experience.

Dreamscape worked with Verizon to install a private 5G network at one of its locations at a mall in Los Angeles. Using that

5G Not Enough? Telecom Companies Look to 5.5G

Mobile companies say an upgrade is coming in a couple of years that will boost connection speeds amid flagging consumer interest

BY DAN STRUMPF

5G TECHNOLOGY has brought faster connections, better gadgets—and a measure of disappointment from people with expectations of something closer to world-changing technology. But just wait, mobile companies are saying: The next upgrade will gin up enthusiasm for advances still to come.

This next iteration of 5G, which the mobile companies are calling "5G Advanced" or "5.5G," is expected to be rolled out by around 2025. For consumers, the upgrades may bring faster connection speeds—something that many parts of the world need. But everyday users may not see many more applications than that, say experts and industry officials. The real advance is that the technology will finally help facilitate more of the far-fetched business applications that 5G initially promised, like self-driving cars, autonomous drones and self-operating factories.

The forthcoming upgrades underscore a reality for many 5G users so far: Beyond faster connec-

tion speeds, it hasn't made a huge difference in their day-to-day lives. 5.5G may not either.

With 5.5G, "for you or me using their phone, you won't necessarily notice a huge difference," says Patrick Filkins, a research manager at International Data Corp. who tracks the internet-of-things and telecommunications-infrastructure markets.

Need for speed

In many markets, 5G speeds have declined in the past year, and the appetite for many consumer applications promised by 5G—like augmented reality—has yet to emerge in a big way.

According to an analysis of global 5G speeds published in February by analytics firm Ookla, median 5G download speeds fell across many markets last year, with Norway, Sweden, Australia and the U.K. logging the steepest declines. Ookla attributed the drop to wider adoption of 5G on existing networks.

The U.S. was an outlier in recording a sharp jump in download speeds last year, which Ookla credited to network improvements by carriers T-Mobile US Inc. and

Verizon Communications Inc.

Still, speeds even in top markets are well below the peak 20-gigabit-per-second download rates set for 5G by the International Telecommunication Union, Ookla says, with the median global download rate standing at less than 1% of that rate in the third

quarter.

Executives at Chinese telecom giant Huawei Technologies Co. have said that 5.5G will bring network speeds closer to that ITU goal, with peak day-to-day speeds of 10 gigabits per second. Consumers will need phones with an upgraded chipset to fully use the

service.

Mohamed Madkour, a vice president in Huawei's networking business group, says the technical improvements behind 5.5G include faster speeds but also other improvements, like lower latency and more responsive connections.

Changes for industry

Those improvements, he says, are mainly geared to benefit big enterprises with budgets for big-ticket upgrades that aren't feasible with current 5G, like automated factories, fleets of self-piloting drones or seaports operated by autonomous vehicles. The upgrades also stand to be a major driver of new business for telecom-equipment vendors who hope to sell new 5.5G equipment to businesses.

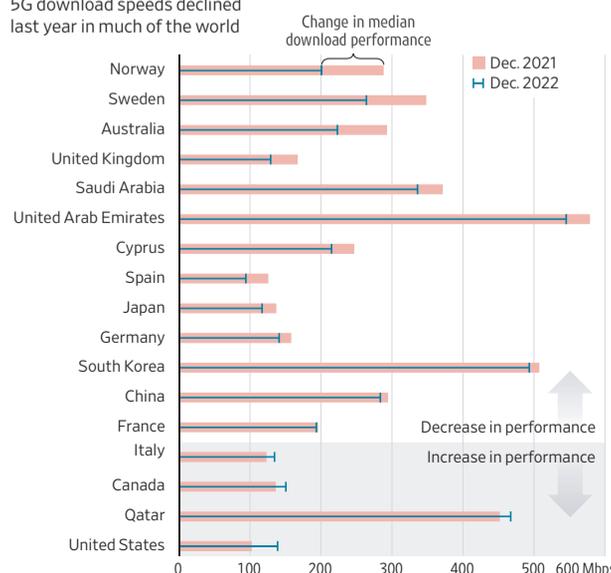
Huawei and other telecom companies have already begun building early versions of such projects using existing 5G technology, like coal mines and seaports with autonomous capabilities, but upgrades will enable even more advances even if consumers may not notice a huge difference, Mr. Madkour says.

With existing 5G, "you are just scratching the surface" of what's possible, he says.

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Slowing Down

5G download speeds declined last year in much of the world



Source: Ookla

JING ZHANG

CHINA

China is allocating up to 370% more 5G spectrum than the U.S.*

USA

Full-power licensed spectrum is the critical foundation for secure and reliable wireless innovation. China knows this, and is freeing up far more 5G spectrum than the United States. Congress needs to restore FCC auction authority and identify new spectrum to secure our leadership of the industries and innovations of the future.

<https://api.ctia.org/wp-content/uploads/2022/09/Comparison-of-total-mobile-spectrum-28-09-22.pdf>

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JOURNAL REPORT | 5G TECHNOLOGY



A mining vehicle that can be controlled remotely.

Telecom Looks to Private 5G

Continued from page R1
networks in industrial settings are the key to making their hoped-for return on their investments.

Industrial settings, including manufacturing plants, mines and energy sites, are low-hanging fruit because the benefits to them of a private 5G network are more obvious—and far easier to explain—than the benefits of 5G in homes or in offices, where Wi-Fi networks already function well.

So far, private 5G, including industrial uses, amounts to less than 1% of the 5G market, according to Dell'Oro Group. But that could be about to change. In an EY survey of more than 1,300 businesses last November, 57% of respondents said they planned to invest in 5G within three years. Similarly, a Gartner survey of 2,203 executives last year found that 49% of energy executives said they planned to invest in 5G in the next 24 months, along with 45% of transportation executives and 35% of manufacturing executives.

Among the reasons for the industry interest in 5G, according to Tom Loozen, global telecommunications leader at EY: a desire to improve efficiency, better track the flow of goods and improve sustainability. Because 5G can track so many materials, and transmit that information quickly to individuals or machines monitoring the production process, “You use less materials, and less energy,” Mr. Loozen says.

Roadblocks ahead

Still, a wider 5G industrial rollout faces a variety of obstacles, including the high cost of 5G chips, according to Soumen Mandal, a senior research analyst at Counterpoint Research. Also, the ecosystem of 5G-capable devices and sensors is still being built out, says Jefferson Wang, global 5G and networks lead at Accenture PLC.

In addition, the various pieces of technology that make up a 5G private network, including sensors, tags, software and cloud infrastructure, aren't often well integrated, Mr. Loozen says. And as 5G networks are being rolled out, there's no mutually understood mechanism among each of the players on how they get compensated for their contributions, says Shashank Modi, managing director and partner at Boston Consulting Group.

One way to cut the costs of building private 5G networks is to leverage some of telecom companies' broader, so-called public networks that are used by both consumers and businesses, says Sylvain Fabre, senior director analyst at Gartner. “In that model, there would be a higher level of sharing of infrastructure and potentially lower cost involved for more price-conscious enterprises,” he says.

Of course, this type of solu-

5G Investment Plans

Percentage of surveyed executives in each sector who planned to invest in 5G in the next two years



Source: 2022 Gartner survey of 2,203 CIOs and technology executives.

tion only works when a factory or industrial site is in proximity to a public network.

Despite these challenges, analysts say enterprise private 5G adoption will accelerate: By 2025, about a third of private mobile network rollouts will be 5G-based, up from less than 10% in 2022, according to Gartner.

After the rollout of public 5G for consumers, mobile network operators are banking on private 5G to serve two key goals: to expand their customer base and earn more by charging companies for 5G spectrum for use in the private networks, says John Roese, global chief technology officer at Dell Technologies Inc.

Automated guided vehicles

To get a glimpse at how 5G might work in industrial settings, consider one of the early adopters, Turkey-based appliance maker Arçelik AS. Arçelik launched a private 4.9G network in an Istanbul washing-machine factory in collaboration with Nokia Corp. and Türk Telekom in 2021. The network allows 38 autonomous vehicles to pick up supplies and deliver them to other locations in the factory during the production process.

The private network underpins the vehicles' effort to pick up and drop off components, and they can sense obstructions, including people.

Utku Baris Pazar, chief strategy and digital officer at Arçelik, wouldn't offer a precise figure on how much retrofitting the factory with 4.9G cost, but says it was less than \$1 million. Since Arçelik switched from Wi-Fi to 4.9G, it has improved the cycle time of the vehicles by 25%, which roughly translates to 10 vehicles saved, says Mr. Pazar.

The company says the performance standards of 4.9G are very close to 5G, which is currently not available in Turkey. Arçelik, however, secured regulatory approval to test a trial private 5G network for use cases that include drone network operations, mobile autonomous robots, and video analytics that can find and trace goods.

The company will work toward upgrading to 5G once it is available and when regulators approve of the move, says Mr. Pazar.

5G in a mine

A mining environment presents one of the core potential industrial use cases for 5G, where falling shards of rock can put people and equipment at risk.

Norcat, a nonprofit that operates a nickel mine in Sudbury, Ontario, has been joining with Toronto-based telecom provider Rogers Communications Inc., Ericsson Canada Inc. and Dell since October to offer opportunities for mining companies to test 5G private wireless technology.

Don Duval, chief executive of Norcat, says companies have tested using 5G to run autonomous vehicles in the mine that can be controlled from off-site.

“After you do a blast, all the rock falls to the ground,” says Mr. Duval. The vehicles “could scoop it up and dump it down another shaft that essentially accumulates at the bottom of an elevator,” and the material is then taken to the surface and to a refinery to get processed, he says.

The effort to oversee the activities of an autonomous vehicle can be done through 4G or Wi-Fi, but 5G brings the advantage of being able to connect many more devices per square kilometer, says Mr. Loozen. In addition, 5G's low latency means information can be exchanged between systems without delay.

Autonomous vehicles may drive with a video camera, allowing them to correct their course, Mr. Loozen says. As cameras on vehicles shoot video, the data is sent to another computer, analyzed and sent back through the network to allow the vehicle to take the next action. “Without a reliable, high-performance, secure mobile network, it would be impossible to build these systems,” says Mr. Roese.

In mines, says Mr. Duval, 5G-powered autonomous vehicles that can be controlled remotely also help the industry appeal to younger workers who may not want to work inside the mines themselves. “The mining industry wants to move in that direction not only for productivity and safety improvements, but also to win the battle for talent to create jobs that young mine workers want,” says Mr. Duval. “If you don't have a resilient communication backbone, you can't get the benefit from that infrastructure.”

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A Satellite Phone That Works Anywhere: The U.S.-China Rivalry Makes That Harder

Both countries want to dominate the technology, and that makes having one system that works in both countries tricky

BY YANG JIE

BUILDING AN affordable service that works everywhere on the planet has been the dream of mobile telephony since its early days. Companies in the U.S. and China are among those getting closer to delivering that service through satellite technology.

But there is a problem. Both of the superpowers are determined to dominate the technology, and each can wield regulations to prevent the other's satellite services from being used within its own borders.

It may be a long time before Elon Musk can achieve his promise last year of “eliminating dead zones worldwide.” Mr. Musk's rocket and satellite company, Space Exploration Technologies Corp., or SpaceX, is expanding its services for customers around the globe—but not in China.

Lynk Global Inc., a Falls Church, Va. startup, last year obtained what it described as the first Federal Communications Commission license for a service that links commercial satellites directly to standard mobile phones, without special hardware or software.

Founder Charles Miller says

Lynk has commercial contracts in over 40 countries and is testing the service in others. What about China? “We haven't applied to test in China,” says Mr. Miller. “We assume they would say no.”

From the sea

The new services work through networks of satellites orbiting the Earth. Phones can link up to one of these satellites even from the middle of a desert or ocean where there are no cell towers or base stations nearby.

While specialized satphones have been around for decades, recent services offered by the likes of Apple Inc. bring the satellite technology to regular smartphones. iPhone users with Apple's latest operating system can beam short distress messages from places off the cellular grid.

But each country has the authority to decide whether to allow satellite signals to transmit within its territory. “Getting such permission could become a major challenge,” says Brady Wang, an analyst at Counterpoint Research.

Cellphone users can generally get roaming service when they travel abroad. That includes Americans traveling to China. Such negotiations are just beginning over satellite service. That is why Ap-



ple's service was initially available only in the U.S. and Canada, and more recently has expanded to parts of Europe.

Several days before Apple announced its service, Huawei Technologies Co., the Chinese telecommunications-equipment maker that has been sanctioned by the U.S. government, introduced a similar service designed for stranded users in an emergency. It works only within China.

Chinese services aren't likely to be permitted in the U.S. or closely allied countries, says Larry Press, professor of information systems at California State University, Dominguez Hills.

The Starlink service from SpaceX, which requires a special

antenna, is available in parts of the U.S. as well as most of Europe, Japan, Australia and elsewhere. A map online shows plans to cover most of the globe eventually, with the exception of China and Russia. SpaceX has teamed up with T-Mobile US Inc. so that T-Mobile users with regular smartphones could tap into the SpaceX satellite network for basic service when they are off the cellphone grid. That service will be available in most parts of the U.S.

U.S. and Chinese companies are also moving on separate tracks in building the satellite systems behind the new services, raising the prospect of a world bifurcated between a pro-China zone using Chinese-made devices and satellites

and a pro-U.S. zone using devices built from components of largely American, European, Japanese and Korean origins.

Industry analysts say the U.S. holds a significant advantage in the competition. Major U.S. tech firms and startups are participating in the race. A SpaceX executive recently said it has launched more than 4,000 satellites.

In orbit

Most of the satellites that talk to mobile devices on the ground are deployed in low Earth orbit, or LEO, which under one definition refers to satellites less than 1,200 miles from the Earth. In general, those satellites cost less to launch and offer better transmission.

Huawei's service uses China's self-developed Beidou satellite network, in which the satellites are more than 10,000 miles from Earth. Huawei users can't receive texts. Beijing has its own plans for LEO broadband with state funding, which it wants to roll out in China and in developing nations that Beijing would like to make part of its sphere of influence, according to a report published by the Washington, D.C.-based Center for Strategic and International Studies in December.

A Chinese official said in March that a state-owned aerospace company planned to build a constellation of satellites only 90 to 180 miles from Earth. The first launch is set for September.

“China is steadily progressing toward its goal of becoming a world-class space leader,” said the 2023 annual threat assessment of the U.S. intelligence community, released in March.

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5G Was Going to Boost Mobile Gaming. Why Hasn't It?

Faster, better internet service isn't critical for playing even the most graphics-intensive smartphone games today. But the rise of cloud gaming could change that.

BY SARAH E. NEEDLEMAN

THE MOST advanced mobile network today, 5G, can make smartphone games run faster and smoother than ever. The technology

was supposed to usher in a new era of mobile gaming. It hasn't happened yet.

Global consumer spending on mobile games fell 6.4% last year, according to estimates from analytics firm Newzoo BV, while 5G has hardly been mentioned on game publishers' earnings calls since the network started rolling out to swaths of the wireless market in 2019.

One reason is that there's little need for speed when playing many of mobile gaming's biggest hits, including Activision Blizzard Inc.'s "Candy Crush Saga" and Nuverse Ltd.'s "Marvel Snap." Three-quarters of the top 100 moneymaking smartphone games today are the kind that don't require superfast internet, according to analytics firm Data.ai. They typically rely on data that's already been downloaded to the player's device or they need to send only small bits of information back and forth over the internet without much urgency.

Meanwhile, for mobile games that do count on super-speedy

internet, such as Riot Games Inc.'s "League of Legends: Wild Rift," developers have figured out how to make them run smoothly on devices with and without 5G because not all gamers have upgraded yet.

"We're going to try our best to serve all the players we have on mobile," says Jack Calvi, head

of product strategy at Riot, a unit of China's Tencent Holdings Ltd. "5G is definitely better, but until everyone migrates, we need to ensure a great experience on mobile regardless of device or service."

Even in the ultracompetitive world of esports, 5G hasn't proved to be a game changer. Many of the most popular esports titles still aren't on mobile

Cloudy future

In the future, 5G could play a major role in interactive entertainment if cloud gaming, or the Netflix-like streaming of games, catches on, according to executives and analysts in

devices and professional esports players still prefer to compete on computers or consoles with land-based internet connections. They can't risk even a split-second delay with a wireless alternative.

easily accessible on mobile devices due to app-store restrictions. Many gamers also aren't familiar with the nascent technology or ready to adapt to the subscription-based business model being developed alongside it, which involves paying a recurring fee to access a catalog of games rather than owning those titles outright.

Should cloud-gaming services like Microsoft Corp.'s Game Pass become easier to use on mobile devices and more prevalent on



"League of Legends: Wild Rift" runs smoothly on devices with and without 5G.

others such as smart TVs, analysts say the overall videogame market—which comprises an estimated more than three billion players globally—could become substantially bigger.

"4G was the breakthrough for streaming video, and we think 5G is going to make cloud gam-

ing ubiquitous," says Sam Scarmardo, director of product management and development at AT&T Inc.

Any screen

Cloud technology makes it possible for people to play games on almost any internet-connected hardware with a screen, eliminating the need to shell out hundreds of dollars for a console like Sony Group Corp.'s PlayStation or a high-end computer. It also removes the need to download games, which eats up storage space, and it saves battery life on mobile devices because the work that goes into making games run is done in the cloud.

"Anytime you eliminate the need for special-purpose hardware, you expand the market," says Wedbush Securities videogame analyst Michael Pachter.

"Infinitely more people will play games."

In a sign of 5G providers' perceived value, Microsoft signed a cloud-gaming deal with U.K. telecom company EE Ltd. that would give EE customers access to Activision's games if Microsoft's pending \$75 billion deal for the "Call of Duty" publisher gets regulatory approval.

The pact with EE, one of several like it that Microsoft has made in recent months, comes after the U.K.'s antitrust authority in March said it was narrowing the focus of its probe into the Activision deal to the cloud-gaming market. The decision removed previous concerns raised by the Competition and Markets Authority that the deal could lessen competition in the more established and much larger console-gaming market.

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Amazon Advances Satellite Plan

The tech giant still needs to mass-produce satellites and get them into orbit but expects to begin offering internet service next year

BY MICAH MAIDENBERG

AMAZON.com Inc.'s satellite-powered internet business is closer to getting off the ground.

The company recently unveiled the antennas that future subscribers of its Project Kuiper internet service would need to communicate with the satellites it plans to start mass producing this year. It isn't clear when the first of those satellites will be blasted into orbit, but Amazon has said it expects to begin delivering broadband connections for some customers by the end of 2024.

"Amazon's never put anything into space," Dave Limp, senior vice president of devices and services at Amazon, said at a satellite industry event in March. "We didn't know how to do it. We had to build a team. But we've made a lot of progress."

Four years after unveiling Project Kuiper, Amazon has laid the groundwork to get its fleet of satellites into orbit. The company has reserved flights on a launch vehicle from rocket company United Launch Alliance, or ULA, that is already in use. Amazon also made a splash last year when it purchased more than 80 missions over a five-year period on new rockets from ULA and two other providers. Eventually, the company plans to operate more than 3,200 satellites.

ULA had been scheduled to blast two Project Kuiper prototype satellites into orbit on its new vehicle, called Vulcan Centaur, in

early May. That mission was recently delayed, however, because of a problem that emerged during a test of the vehicle, a spokeswoman says. During the test, a hydrogen leak emerged, causing a fast-burning explosion, ULA's chief executive said in a tweet.

The rocket provider has completed all other major development activities for Vulcan Centaur's first launch, which would include Amazon's satellites and other payloads, the ULA spokeswoman says. An Amazon spokesman declined to comment on the delay.

Taking on Starlink

Amazon is one of several companies that either are offering or plan to offer high-speed, low-latency internet connections via satellites orbiting relatively close to Earth. They say that kind of performance will distinguish their offerings from other internet services that depend on satellites stationed farther away, where beams cover more of Earth at once but face longer times sending and receiving signals.

Still, Project Kuiper and the others will have competition from within the satellite industry, as well as from companies that have built out on-the-ground internet infrastructure.

One such competitor is Starlink, the satellite-internet unit operated by Elon Musk's SpaceX, which has several thousand satellites in orbit already and has more than one million subscribers. OneWeb, a London-based company partially owned by the U.K. government, in March completed the deployment



United Launch Alliance rockets, among others, will launch Amazon satellites.

of its initial fleet, after an Indian launcher blasted a batch of its satellites into orbit. Some governments, including China's, are planning similar constellations.

Amazon has discussed investing \$10 billion on Project Kuiper. Annual operating costs for a fully built-out network are steep, with expenses for replacing satellites running to at least \$1 billion annually, assuming the satellites have a five-year lifespan, according to an estimate from McKinsey & Co.

At Amazon's 2021 shareholder meeting, Jeff Bezos said he couldn't guarantee that the company's bet on Project Kuiper

would generate returns. "I believe it will, and we're working hard to ensure that's the case," said Mr. Bezos, who at that time was still the company's chief executive.

Amazon's current CEO, Andy Jassy, indicated in a recent letter to shareholders that Project Kuiper has the potential to become a big business, considering the hundreds of millions of households and businesses around the world that don't have reliable internet access. What's more, few companies have the technical expertise and investment wherewithal to serve such a large market, he said in the letter.

"We believe Kuiper represents a very large potential opportunity for Amazon," he wrote.

Eye on costs

Scaling up the business is important to getting toward profitability, given the startup costs, says Naveen Kachroo, head of product and business development at Project Kuiper.

Project Kuiper has been focused on minimizing costs that could pose hurdles to adoption, he said in a recent interview.

To that end, Project Kuiper has worked to create satellites that are able to deliver significant amounts of salable internet capacity, Mr. Kachroo says. "We're trying to reduce the number of satellites we need," he says.

Project Kuiper's user antennas also have been developed with cost in mind, he says, and will need relatively less power to form a link with satellites.

The standard customer terminal measures about 11 inches square and weighs roughly 5 pounds not counting the mounting bracket. Amazon has said it believes it can manufacture these terminals for less than \$400 each. There is also a larger terminal for business clients that need more bandwidth and a

smaller one that will provide less speed but at a lower price.

Prices for hardware and monthly service haven't been disclosed. One benchmark for residential customers is SpaceX's Starlink, which charges households in the U.S. \$90 or \$120 a month for service based on location, following a \$599 one-time hardware fee. Costs for subscribers in developing countries are less, according to Starlink's website.

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WSJ **GIMLET**

Surgeons Use 5G to Help Them Operate With Greater Precision

Doctors can hold a tablet PC above a patient's chest and see the exact location of tumors and tissues

BY JIYOUNG SOHN

SEOUL—Private 5G networks could transform the way doctors perform complex surgeries and coordinate with one another on operations.

A glimpse of this future is visible in South Korea, a country that has often stood at the forefront of telecommunications and is known for actively experimenting with and quickly adopting new technologies. At major hospitals across Seoul, private 5G has become the backbone technology for everything from speeding up on-site logistics systems to enabling the remote training of medical professionals.

An early mover in this nascent space is Ewha Womans University Mokdong Hospital in Seoul. A private 5G network has been deployed at the hospital to support the vast data-transfer needs of a new technology that uses augmented reality to help guide surgeries.

This so-called AR surgical guide, developed by South Korean medical-technology startup SKIA Co., is assisting breast-cancer surgeries at Ewha hospital. When a tablet PC is held above a patient's chest, CT images of the area the tablet is pointed at are displayed on the screen, showing the precise location of tumors and tissues. It's like looking into the body before any incisions have been made. The tablet can be moved around above the chest to see the CT images overlaid at varying angles.

Traditionally, a doctor would look through a patient's CT results on a computer monitor, and then make incisions of what they believe is the right depth at the desired location to carve out cysts or tumors. The new AR technology works as an assistant

helping surgeons operate with greater precision.

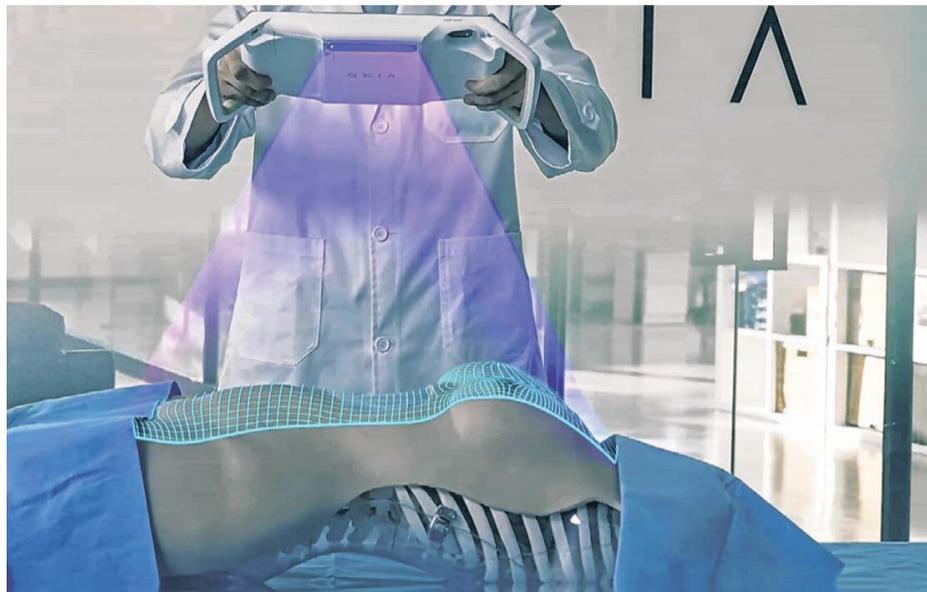
"The AR technology acts like a navigation app for surgeries. It's much easier to get to your destination when you have a digital guide," says Lee Jun-woo, a breast-endocrine surgeon and oncologist at Ewha hospital who has been testing SKIA's product on patients.

The technology wouldn't be

segment that's gradually growing. The 5G healthcare market—encompassing 5G-supported augmented-reality and virtual-reality technology services, virtual consultations, remote patient monitoring and more—was valued at \$2.5 billion in 2021 and is expected to grow an average of more than 35% annually from 2022 to 2030, according to Global Market Insights, a market

research firm.

SKIA is preparing to apply for regulatory approval from South Korea's Ministry of Drug and Food Safety to enable widespread use of the AR surgical guide on patients. The firm plans to subsequently submit its product for approval by the U.S. Food and Drug Administration. The Seoul-based company is collaborating with other local hospitals to test the technology in assisting procedures including facial-reconstruction surgeries, liver



A tablet is held over a human dummy to demonstrate how SKIA's surgical guide technology works.

possible without the ability of the hospital's private 5G network to transmit data without lags. Every time a tablet showing CT images is used in surgery, a vast amount of data is being generated and transferred from a computer server to the tablet via the network.

Growing use

Medical technologies leveraging 5G, such as SKIA's, represent the beginnings of a new business

research firm.

SKIA is preparing to apply for regulatory approval from South Korea's Ministry of Drug and Food Safety to enable widespread use of the AR surgical guide on patients. The firm plans to subsequently submit its product for approval by the U.S. Food and Drug Administration. The Seoul-based company is collaborating with other local hospitals to test the technology in assisting procedures including facial-reconstruction surgeries, liver

Nable Communications Inc. which deployed the private 5G network at Ewha hospital.

Customization is another upside of private 5G. The network equipment behind Ewha hospital's private 5G network, provided by Samsung Electronics Co., was specially engineered to give priority to upload capabilities, which are most needed by technologies like SKIA's. About 40% of the capacity of the hospital's private 5G network is dedicated to uploads versus down-

loads, compared with 20% for public 5G, which caters more to demand for fast downloads of videos and content, says Samsung's Hwang Kyu-seong, who is leading the firm's various private 5G projects.

Looking ahead

Going forward, private 5G networks could help power the spread of advancements in the medical space such as the live streaming of surgical operations that can be useful in areas like training new doctors, as well as remote surgeries in which doctors could partake in a procedure from locations outside the operating room, Mr. Hwang says.

At Ewha hospital, such moves are already in the works. Earlier this year, the hospital took its first steps toward collaborative remote surgeries by connecting an operating room via its private 5G network with doctors based in other locations, who were able to virtually join in a surgery and exchange feedback.

As remote-surgery technology matures and expands, collaborative surgeries like the ones being tested at Ewha hospital could become more commonplace, while hospitals could also use the technology for training doctors in techniques such as robotic surgeries, says Mr. Lee, the breast-endocrine surgeon at Ewha hospital.

Beyond the medical space, South Korea is working to speed the adoption of private 5G networks in a diverse range of industries. In 2021, the Ministry of Science and ICT designated two frequency bands dedicated to private 5G for use by nontelecom companies and organizations interested in installing their own networks.

The ministry set aside 60 billion won, roughly \$46.2 million, in funding for 2022 and 2023 to support new private 5G projects across South Korea. So far, private 5G networks have been deployed to support smart factories run by large firms such as LG Electronics Inc., fleets of autonomous robots at the headquarters of local internet giant Naver Corp., improved logistics systems at various companies and the staging of hologram concerts.

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SKIA

The Battle Over Fixed Wireless Internet Service

Cable firms have lost business to cheaper rivals. But they insist customers will return to broadband.

BY PATIENCE HAGGIN AND WILL FEUER

CONSUMERS increasingly are ditching traditional broadband plans for more-affordable 5G fixed-wireless internet service.

In response, cable companies say they may be losing some battles, but in the end they'll win the war—and that customers who have switched will return.

They point to people like Dylan Spring of the Albany, N.Y., area. He dropped his Spectrum home internet service and started using T-Mobile US Inc.'s 5G-powered fixed-wireless service in 2021, when he was living in Albany. It cost half the price he had been paying for broadband.

He says he didn't notice any lagging or delays while gaming, streaming or working from home during the pandemic.

That changed this year when he moved to Rensselaer, the next city over. He found T-Mobile's service was much slower in his new building—so he switched back to Spectrum, the broadband service from cable provider Charter Communications Inc.

Since 2018, wireless carriers like Verizon Communications Inc. and T-Mobile have used the ex-

cess capacity on their fifth-generation cellular networks to lure broadband-internet subscribers away with 5G fixed-wireless plans that in some cases can cost half of what a cable plan does. As cable companies bleed subscribers to fixed wireless, they've harped on the cheaper service's shortcomings in public rhetoric and TV ads, in a phone-versus-cable tit-for-tat.

Not a Ferrari

With fixed-wireless plans, a subscriber uses an in-home receiver to pick up signals from a cell tower. A number of factors can hurt the web speeds, including network congestion, the receiver's distance from the cell tower and obstacles such as trees between the receiver and the tower. Both T-Mobile and Verizon acknowledge these limitations on their websites.

An analysis of consumers' broadband experiences by mobile-analytics company Opensignal Ltd. in November 2022 found that incumbent cable and telecom companies "typically comfortably beat" 5G fixed wireless. The study considered factors such as speed, consistent quality and video experience. Yet the performance issues haven't

stopped consumers from migrating to 5G fixed-wireless service.

The new plans helped T-Mobile and Verizon sign up 2.8 million wireless-internet customers in 2022. Verizon, which reported earnings on Tuesday, said its consumer unit added 256,000 fixed-wireless subscribers in the first quarter of this year. Meanwhile, Comcast Corp., owner of Xfinity-branded broadband and cable services, and Charter have reported slowing subscriber growth, and have even lost subscribers in some recent quarters.

Both Comcast and Charter have identified competition from fixed-wireless plans as one of the

key reasons for slowing subscriber growth. Both also have told Wall Street: Just wait, those customers will come back.

"Given the issues with fixed wireless, product reliability and scalability, we expect those customers to find their way to us over the long term," Charter Chief Financial Officer Jessica Fischer said on the company's fourth-quarter earnings call in January.

"There's a tranche of customers that are just looking for the lowest price out there," Jason Armstrong, Comcast's chief financial officer, acknowledges in an interview. But he says Comcast already is seeing boomerang customers who have returned to broadband after growing frustrated with fixed wireless. "They're coming back and forth all the time."

While providers of fixed wireless don't dispute that their product is inferior in some ways, they say it is more than adequate for

many consumers. T-Mobile Chief Executive Mike Sievert put it this way during the company's fourth-quarter earnings call in February: "When somebody who is a fiber provider says, 'You know that product is not as good as our product,' it's kind of like the people at Ferrari pointing a finger at the world's bestselling car, Toyota, and saying, 'We're faster. We have the faster car.' Yes, but Toyota is the world's bestselling car. And that's because—and if you look in the case of T-Mobile 5G home broadband—because it's perfectly suited to what people want." Most of T-Mobile's fixed-wireless customers are coming directly from cable plans, he said at the time.

Verizon executives have said they plan to deploy more C-band spectrum later this year, which should allow them to accelerate their fixed-wireless growth. C-band spectrum is an important swath of airwaves that help enable fast 5G speeds, along with broader coverage.

Dueling ads

As the battle for consumers heats up, the phone and cable companies have taken their tit-for-tat into viewers' living rooms, trading barbs in splashy TV commercials.

For Mr. Spring, even though he is back with Spectrum home internet service, the arrival of T-Mobile's wireless home-internet offering in Albany brought long-desired competition to the market.

"I think it's a great way to get more competition in areas without having to do too much infrastructure," he says.

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DAN PAGE



JOURNAL REPORT | 5G TECHNOLOGY



Fiberscope chief Jason Jolly says demand for his fiber-splicing crew has been 'nonstop.'

Internet Plan Lacks Workers

Continued from page R1 last two months.

And that's *before* the money starts flowing from the government's \$42.5 billion broadband spending package. The industry is bracing for that spending to start flooding the market as soon as this year.

"As soon as everyone gets rolling on these projects, the supply chain is just going to get worse and the workforce is going to get slim," says Jimmy Lewis, co-founder of Cajun Broadband, an internet provider that serves more than 2,000 homes in south-central Louisiana.

The result could be a worsening of the delays and cost inflation that already are plaguing wired-internet providers' network-expansion projects, industry analysts and executives say. That raises questions about whether the new federal spending will be enough to end the so-called digital divide by the Biden administration's target of 2030, or even at all.

Millions are waiting

Millions of U.S. households still don't have access to fixed broadband, according to the Federal Communications Commission. Advocates say getting them connected will let residents participate in remote work and school, start businesses from home, connect virtually with doctors and have all kinds of other benefits.

Mike Stacy, a former coal miner and current city council member in Elkhorn City, Ky., says his town has been losing residents because of the lack of fast internet. The town's economy used to be powered by coal-mining jobs, he says, but the only good-paying jobs left now are at the hospital. His wife, he says, was offered a work-from-home job that paid well, but she couldn't take it because their home internet is too slow.

Cellphone companies could help by providing wireless internet service to more homes, and they could benefit from the new subsidies. States can use the federal money for other forms of internet connection in areas where expanding fiber networks is deemed too costly. If labor costs continue to rise, more money is expected to flow to 5G wireless service, analysts say.

"There are limited dollars, so we have to make choices," says Andrew Butcher, president of the Maine Connectivity Authority. "If labor access is prohibitive or even if just geographic conditions are

prohibitive, we absolutely are going to need to evaluate how to deploy alternative solutions."

But wireless internet is slower and has lower capacity than fiber connections, a drawback that is expected to become more important as Americans' data use continues to grow. So while wireless service can help address the current labor challenges in some cases, it may not be the ideal broadband solution.

Fiber-optic internet wired directly to homes, though labor intensive and costly to build, has become America's favorite way to get online because it lets users upload data as quickly as they can download. That eliminates lag during video calls, online gaming and other activities that became more widely adopted during the pandemic.

Shrinking the gap

At the current pace of hiring, the U.S. broadband workforce of some 478,000 won't be enough to meet the government's timeline, analysts and executives say.

The Fiber Broadband Association, an industry group promoting network expansion, estimates that more than 205,000 additional workers will be needed through 2026. Other estimates for how many more fiber workers will be

port the government's broadband-expansion programs, though that estimate could vary depending on the timing of certain projects. Ms. Geiser says that figure is "much more realistic."

Whatever the actual numbers are, the expected surge in demand for fiber splicers has the fiber industry and government offices racing to get ahead of the labor

splicing skills to start in the 2024-25 school year at his children's high school, the White River School District outside of Seattle. Fiber-network operator Gigabit-Now, a unit of IsoFusion, plans to recruit from the program and further train graduates.

Meanwhile, some companies are taking steps to lock in workers now for expansion projects that

Within the next two years, the company expects to have half its union workers retrained, he says.

Further up the supply chain, equipment manufacturers like Clearfield Inc. are trying to make simpler products to reduce the need for labor. Clearfield CEO Cheri Beranek says the company's products, like its preconnectorized drop cables, can reduce fiber-splicing needs by 40%. Preconnectorized cables, often called a plug-and-play solution, minimize the need for in-field splicing.

Bonuses are available

Despite industry efforts like these, the current fiber workforce is struggling to keep up with demand. Jamie Barton, senior vice president of global human resources and labor relations at AT&T, says the company has about 2,000 openings for installation technicians, more than usual. She says the company has been offering hiring bonuses, sometimes of up to \$5,000 in tight markets like Texas, and referral bonuses of up to \$2,000 to recruit workers.

Brock Nichols, a one-man fiber-splicing contractor who has been working on a project in Arkansas since 2021, says he gets calls at least twice a week asking him if he's available for other projects. "It's more than I can possibly

The fiber industry and government offices are racing to get ahead of the labor challenges.

challenges. Equipment manufacturers are making simpler fiber products that are easier to install, companies are teaming up to offer training programs and governments are adding fiber-technician certifications in state and community colleges.

Among the more notable efforts, fiber-optic cable manufacturer Corning Inc. has joined with industry giant AT&T Inc. as well as the Wireless Infrastructure Association on training and apprenticeship programs for fiber tech-

are expected to benefit from the federal funding.

Edinburg, Va.-based Shenandoah Telecommunications Co. is moving more of its fiber-splicing work in-house to protect against delays from labor shortages. Chief Operating Officer Ed McKay says. The company now does about 25% of its fiber-splicing work in-house, he says, whereas nearly all of it was done by contractors before last year.

Mattoon, Ill.-based Consolidated Communications Holdings Inc.,



At the current pace of hiring, the U.S. broadband workforce won't be enough to meet the government's timeline, analysts and executives say.

needed this decade have run as high as 850,000. But Nell Geiser, research director at the Communications Workers of America, says some of those figures are "unsubstantiated." The Government Accountability Office estimates that some 34,000 additional workers could be needed this year to sup-

porters.

One broadband executive is even tapping his children's high school to train the next generation of workers. Dan Sivils, chief operating officer of internet provider IsoFusion, says he helped establish a career and technical-education program focused on fiber-

which has hundreds of employees with long experience working on copper wirelines, is working to retrain its staff. Already, some 30% of its 1,100 unionized workers—who make up about 95% of its field technicians—have been trained to work with fiber, operations chief Gabe Waggoner says.

do," he says. "Right now, you could just about stand back with a dart and throw it at the United States and find work in that area. There's so, so much going on."

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